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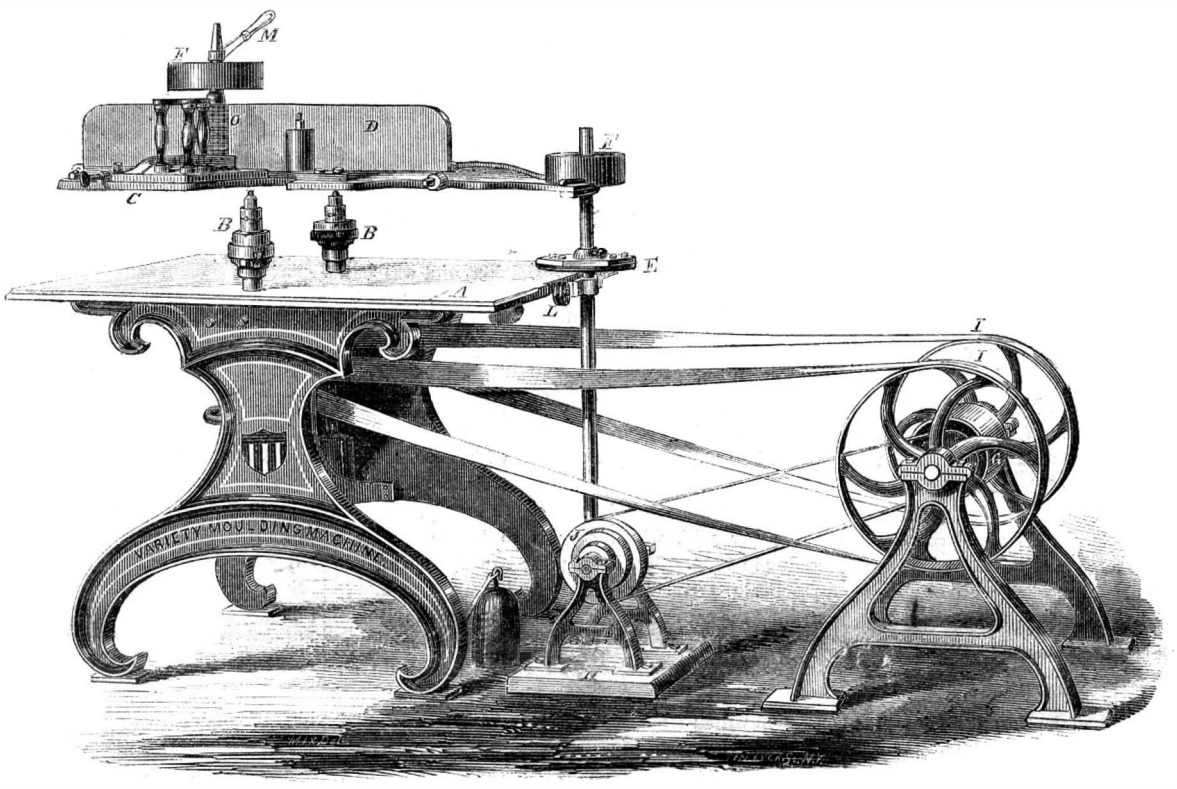
VARIETY MOLDING MACHINE.

In our notices of the Fair of the American Institute, we mentioned, briefly, the machine for carving straight, waved, circular and elliptical moldings, called the "Variety Molding Machine," which was exhibited by S. M. Hamilton, and which attracted much attention. We now present full illustrations of it.



IMPROVED MOLDING MACHINE.

Fig. 1 is a perspective view. G is the driving pulley, I I the pulleys from which motion is taken for the heads, which run with quarter-twist belts. A represents the table, through which project the cutter-heads, B B. This view shows the machine as used in all irregular work, such as is done with a pattern or duplicate. Above the table, A, will be seen the straight molding attachment, raised for the purpose of giving a clearer view of the machine for its various uses. The cast-iron table, C, is provided with a rest, D, feed-roll, O, driving-pulley, F, shipper, M, with pressure rod and spring. When straight moldings are needed, the iron table, C, is placed upon the table, A, and a belt is passed around the pulleys, F F, to which motion is communicated by the conical pulleys, J, by the small belt from the counter shaft, H, upon which the pulleys, I I, are placed. The straight attachment, when put upon the machine, is secured by two nuts, which hold it firmly in its place.

For waved molding, the point of the table, C, is held by a weight, with a cord passing over the small pulley, L, against the cam, E. This table being held firmly on a pin at one end and resting against the cam, E, at the other, a very beautiful style of waved moldings, for ornamental purposes, is produced. A still more elegant variety may be made by inserting an inclined plane between the cutter-head and rest, D, thus running the work obliquely to the head.

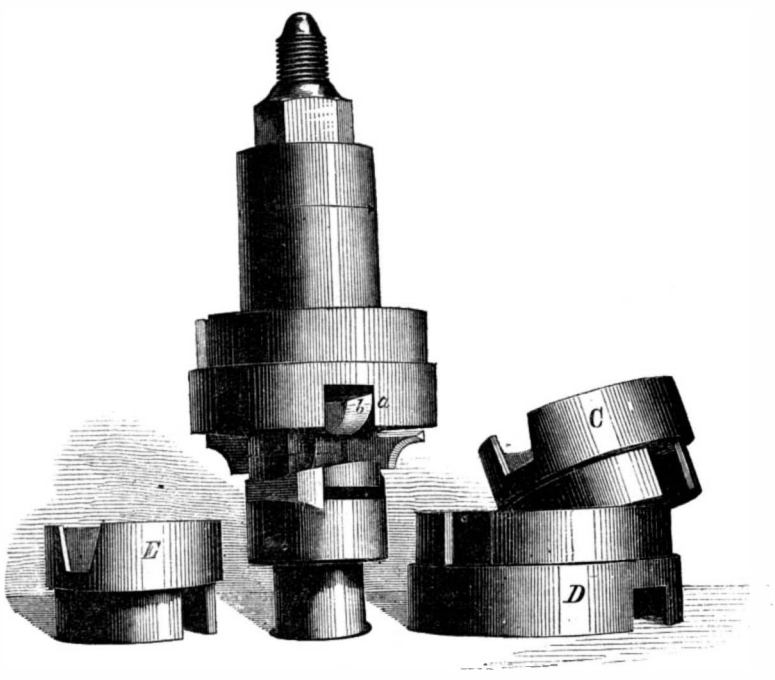


Fig. 2 is a view of the combination cutter-head and guards, *a* C D E, are cylindrical flanges, projecting from a thin collar upon which they are cast. They are placed above the cutters and held between the collars, and serve as a plane stock to gage the thickness of the shaving, and prevent accidents by the cutters taking a sudden and deeper hold of the stuff than is necessary. The portion, *a*, of the guard projects below the top of the cutter, *b*. The work to be cut also comes above the lower line of cylinder, *a*. When the heads are adjusted, the point of the cutters are set as much beyond this revolving stock as is necessary to give the proper thickness of shaving. This makes the head safe to work, which, where stuff is held by hand, is very desirable. The cutters, as seen in the engraving, are made in sections, and set in double grooved collars at angles with each other. They are susceptible of many transpositions, thus reducing the cost of tools. The cylinders, *a* C D E, are of different sizes to suit the projection of the cutters, which may be more or less. The guard collars and cutters are all firmly held in their places by a turn of the nut on the top of the spindle.

The objects gained are as follows:—First, Saving of cutters, a transposition answering the purpose of a new tool, Second, working curved and complicate moldings in all conditions of the grain, without splitting; Third, the heaviest moldings can be worked with a divided cut as easily as a piece of one-third the size with a whole cutter; Fourth, cutters are more easily kept sharp, as there are fewer acute angles; Fifth, ease of adjustment, and the impossibility of their becoming loose in the head and flying out.

At the late Fair of the American Institute, this machine received the first award of a large gold medal, on the reverse of which is engraved, "Awarded to S. M. Hamilton for the best Variety Molding Machine. Combination of machinery for producing great results, 1859."

This machine is the result of several inventions, for which five patents have been taken—two by Isaac P. Tice, of Baltimore, Md.; two by Jonathan P. Grosvenor, of Lowell, Mass.; one by Lewis M. Berry, of Boston, Mass. S. M. Hamilton is appointed trustee proprietor, and in his name the business is transacted; therefore, all inquiries in relation to the matter should be addressed to him at Baltimore, Md.

TO BORE A HOLE THROUGH GLASS.—A drill supplied with emery and water is better than a diamond for making small holes through glass. As emery does not improve the edge of the drill, a piece of iron wire may be substituted. A diamond will cut out circles, making large holes, but is quite unsuited for boring. Common glass may be drilled with an ordinary bow-drill, by keeping one or two drops of spirits of turpentine on the glass at the point of the drill.

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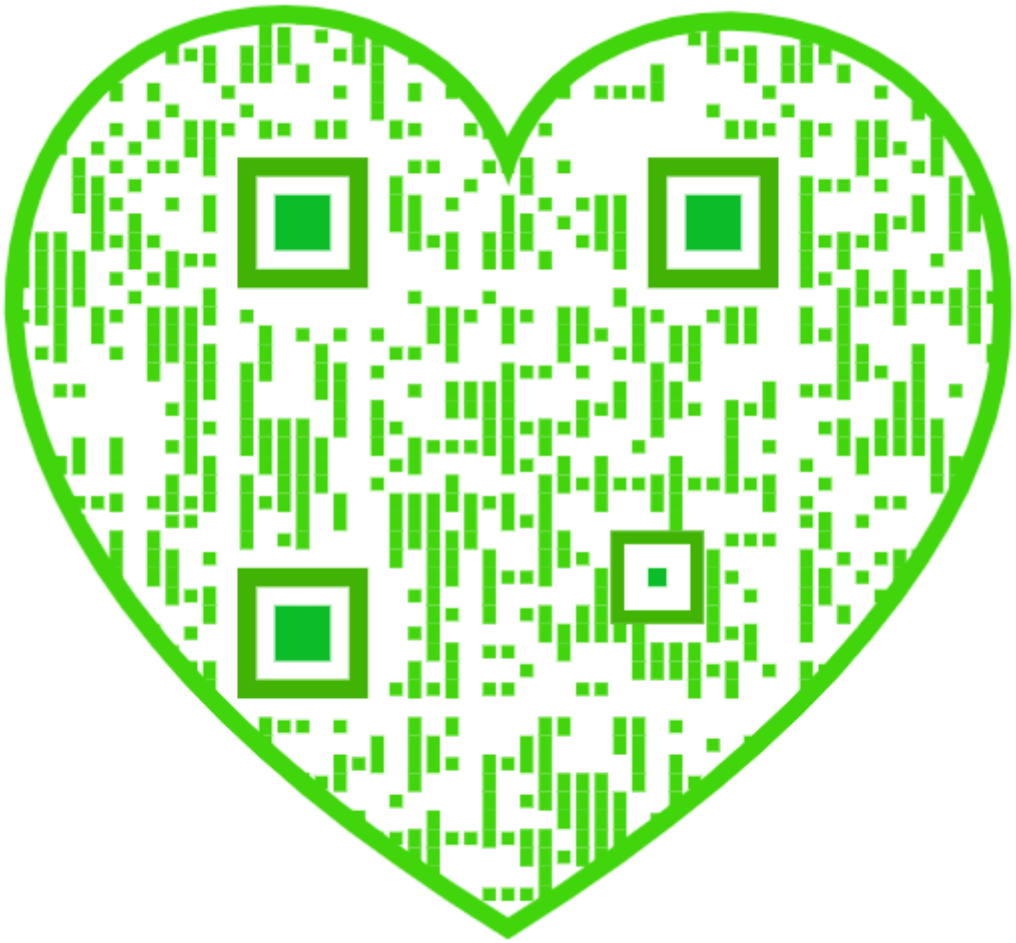

THE MANUFACTURES OF PATERSON, N. J.

THE SILK MANUFACTURE—FLAX AND HEMP—PAPER-MAKING—BLEACH, DYE AND PRINT WORKS—MISCELLANEOUS.

[Concluded from page 315.]

Although it is only 20 years since the first silk thread was spun by machinery west of the Hudson, yet Paterson has confessedly become the great seat of that beautiful manufacture, producing more than all other places in the Union put together. This result is owing, in an eminent degree, to the public-spirited and persevering exertions of John Ryle, one of the industrial pioneers of the age. It will be recollected that, in 1838, there sprung up an unusual excitement in this country, relative to the culture of raw silk; many an orchard having been unceremoniously cut down to be replaced with mulberry trees, on which worms that had no prospective existence were to browse and spin their glossy cocoons. At that time Christopher Colt leased an apartment in the Gun mill, and fitted it up with silk machinery. A brief experience satisfied him that the business could not be profitably conducted, and the attempt was abandoned. The concern was sold out to Geo. W. Murray, of New York, who engaged Mr. Ryle to superintend it. In 1840 work was resumed in an attic, with some half a dozen hands. Subsequently, weaving was added to the spinning of silk, and for some time carried on, but abandoned, not because it proved unprofitable, but to make way for sewing silks, twists, &c., for which there was a heavier demand. The American flag which so long waved in graceful folds over the New York Crystal Palace, was spun and woven at Mr. Ryle's factory. His original design, and one which he has since perseveringly followed up, was to naturalize as much of the manufacture as could possibly be carried on in this country. For the success which has attended this undertaking, not only the people of Paterson, but of the whole Union, are placed under obligations. In 1846 Mr. Murray sold out the establishment to Mr. Ryle. The business continuing to increase rapidly, two large additional buildings of dressed stone were erected and stocked with machinery in 1851. Three years later, the foundation of the Murray mill was laid, and the mill opened in 1857. This fine factory is about 200 feet in length and surmounted by three parallel roofs, sustained by heavy iron columns. Steam power is used. In it and the Gun mill are 11,134 spindles of all kinds, now working up 1,800 lbs. of raw silk every week into fringe, tram, sewing silks, embroidery, twist, and everything in that line, besides dyeing it. The establishment is capable of turning out 2,500 lbs. of the finished article. The number of hands now employed is 500.

In 1850, a new silk factory, also driven by steam, was erected by John C. Benson, who is probably the oldest manufacturer and principal manager in the country, having been in the harness since 1810, in connection with the cotton, wool and silk interests. The number of spindles in Mr. Benson's establishment is 1,600, and the number of operatives usually from 60 to 80. The mill is capable of turning out 450 lbs. of finished goods per week—equal to a consumption of 480 lbs.—comprising fringes, embroidery, sewings, machine spool silk, &c. There is also a dye-house attached. Mr. Benson has made several improvements in silk machinery, and is at all times able to command the highest market prices.

Hamil & Booth went into operation in 1835. Last year they removed to the upper part of Murray mill, and enlarged their establishment. It now furnishes employment to 100 operatives, who turn out, weekly, 500 lbs. of fine silks, such as sewings, fringes, tram, and every description required by fringe manufacturers. The number of spindles of all kinds is 3,540. Their office is at No 540 Pearl-street, New York.

Stelle & Walthal followed in 1856, making the usual varieties of silk, in an apartment of the Star mill. They run 1,100 spindles and employ about 80 hands.

The spring of 1858 witnessed a vast increase in the number of places were silk was manufactured, this business having been the first to participate in returning prosperity. The demand was abundant, while the prices paid for raw material had gone down 50 per cent. It seemed for a time as if all creation were about to engage in making silk. Like all other excitements this had its day. Of the new concerns, the most important is that of D. B. & J. C. Fuller, who removed from Connecticut and built a neat factory near the railroad depot. These works are driven by steam, and employ 70 operatives on their "interlooped sewing-machine twist," for which a patent has been obtained by Mr. Fuller. The total number of spindles is 1,516, producing at present 175 lbs. per week of the finest quality. With additional machinery about to be put into the mill, the product can be increased about 30 per cent. Geo. W. Hooley is superintendent.

There are three other places where silk is produced, employing in all about 100 hands, and producing 350 lbs. per week. The total number of silk spindles running (all kinds) in Paterson are estimated at 15,000, besides 6,000 temporarily idle. The number of employees is 900, or 200 less than if all were in full blast. The weekly consumption of raw silk is 3,500 lbs., which might, with present facilities, be increased 33 per cent. The amount required for waste will average 8 per cent, and the wages paid about $3 per week to each operative, probably $125,000 per annum in the aggregate. The employment is light, healthy and pleasant; and the silk mills are, without exception, models of neatness and cheerfulness. In both these and the cotton factories, wages are now higher than for many years previously.

It has already been stated that linen duck was made in the Passaic mill as early as 1816, and that the linen manufacture was carried on for several years in the Phœnix mill. No other attempt, that we are aware of, was made until 1844, when the Dolphin mill was built on the upper canal, at its southern extremity. This is a very handsome and substantial structure of dressed stone, 200 feet in length and three stories high. Here flax and hemp of all kinds are spun and woven, principally into heavy fabrics, by an incorporated company, for which Mr. Meldrum is superintendent. The number of employees is 130. Another concern, with about a dozen hands engaged, has recently gone into operation.

Reference has already been made to Kinsey, Crane & Co.'s paper mill, which appears to have commenced running in 1804. Mr. Kinsey, the superintendent, was a practical paper-maker, and a very ingenious man. In watching the cotton transferred in a continuous roll from the cards, the idea occured to him that paper might be made by a similar process. In 1807 he applied for a patent, and two years afterwards his machinery went into operation with partial success. The fact that most of it had to be constructed of wood, or inferior materials, prevented the full realization of his hopes. His partners, who had furnished the means, decided, in opposition to Mr. Kinsey's wishes, to turn the building into a cotton factory, which it has ever since continued.

The Society for Establishing Useful Manufactures had, in 1836, completed a new factory, built of stone, near the Rogers' works. Next spring it was leased to Seymour & Butler, who subsequently dissolved, when the present firm of H. V. Butler & Co. was formed. The manufacture of fine paper was prosecuted with success in that establishment until the expiration of the lease, in 1858; the mill turning out 24,000 lbs. per week.

E. Curtis having purchased the lot formerly occupied by Paul & Beggs as a machine-shop, in the early part of 1837, put up a paper mill, and for a year or two turned out about 12,000 lbs. per week. Mr. Curtis failed in business, when the mill passed into the hands of Persse & Brooks, of New York, who retained it until 1840, when they sold out to Seymour & Butler. In 1850, the firm having been changed to H. V. Butler & Co., they built the Ivanhoe mill, one of the most extensive, beautiful and complete establishments in the world. Since its commencement, we believe this mill has never stopped three days at a time, though running night and day. The works are driven by three large water-wheels and a steam-engine of 75-horse power. The main building is of dressed sandstone, and all are fire-proof. Two Fourdrinier machines run off 35,000 lbs. of the finest quality of paper every week, and other valuable improvements are in progress of construction. The number of employees at the Ivanhoe mill is 135.

The first works in the State where bleaching was done by chemicals, were erected in 1813 by James Shepherd, on Ackerman's brook, near Acquackanock, where the first goods, beetled and finished after the European style, were prepared for the New York market. Subsequently Mr. Shepherd removed to Connecticut, but returned to New Jersey, resuming near Little Falls. In 1837 he removed to Paterson, where he put up the Washington bleach-works, now part of Danforth, Cooke & Co.'s locomotive shop. Mr. Shepherd continued to prosecute the business until 1834, when he sold out to Mr. Danforth, since which time he has not been engaged in business. He is one of the few pioneers who never had to compound with a creditor.

It has been stated that the society commenced bleaching and printing (by hand) in 1794. They do not appear to have concerned themselves any further with the business until 1836, when they erected a large stone building on the upper canal for a Mr. Maitland. After passing through a number of hands, the place was finally absorbed by the Rogers' locomotive works, a few years ago.

The intelligence and energy of D. G. Scott have made bleaching, dyeing and printing, one of the great industrial resources of Paterson. Early in life, Mr. Scott had been engaged in the manufacture of linen goods; and having occasion to visit the place he was struck with the facilities it afforded for his present pursuit. In 1849 he commenced weaving and bleaching towels and diapers. Two years afterwards he purchased the Franklin mill, and added to his business dyeing and the printing of Canton flannel by machinery. This article in a short time was able to supersede the woolen altogether and drive it from the market. Finding the demand largely increasing, Mr. Scott, in 1855, purchased another lot, where he put up the Waverley mill. This was accidentally burned down two years afterwards, and rebuilt in the most substantial manner, the present edifice being one of the few mills in Paterson, combining architectural elegance with convenience and capaciousness. It is the largest and most complete establishment of its kind in the United States, and is fitted up with the first description of machinery. At these works (the only instance in this country), as many as six friction calenders are run together. Most of the coats now worn are lined with the product of these mills. The bleaching of shirtings and the printing of maddered calicoes and pantaloonery goods have also been extensively carried on for some time, from one to five colors being put on. All the work is done to order, the lining goods going altogether to the house of Thomas Munroe & Co., of New York. Mr. Scott was the first to do these goods by machinery, and it may be safely said that nowhere else has the same perfection been reached. The proprietor of these works is one of the most enterprising and public-spirited men of whom Paterson can boast. The number of employees in both mills is 300; quantity of coal consumed annually, 2,000 tuns; value of drugs and chemicals used, about $100,000. About $9,000 per month is distributed in the place for wages and other purposes. Arrangements are now in progress to erect a third factory on the Mallory mill lot (adjoining the Waverley), which, with one of the best water privileges in Paterson, has been purchased by Mr. Scott.

Since 1840, C. Huber has carried on the bleaching, coloring and spooling of cotton yarn for trimmings and fancy works, employing about a dozen hands. Mr. Huber is preparing to enlarge his premises considerably, as he is at present unable to turn out the work offering. The place where his factory is situated was not long since a dreary fen, which has been, by his exertions, converted into a paradise of beauty. He designs adding the making of native wine from the grape to his other business.

John Murphy, in the beginning of 1858, established the Victory mill on the old road leading to Little Falls, for the purpose of bleaching yarns and Canton flannels, the former being a new feature in Paterson. Previous to Mr. Murphy's successful attempt, yarns had to be sent out of the place to be bleached, and orders consequently were seldom or ever taken where yarns had to undergo this process. About 20 hands are employed at Mr. Murphy's mill, and from 2,500 lbs. to 3,000 lbs. turned out every day, in part for the New York market. Mr. Murphy is also about having an addition made to his establishment.

Wm. C. Brown employs from 15 to 20 hands in dyeing silk, cotton and worsted goods.

The distillation of pyroligneous acid and other liquors for calico-printers was commenced about 15 months ago by George Barnes. About 1,000 gallons are made every week, principally for the Paterson and New York markets.

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Bobbin-turning was commenced by Thos. Van Riper, on Peckman's creek, about 1795. Mr. Van Riper afterwards carried on the business for many years in Paterson. His son, P. V. H. Van Riper, has done a great deal to develop this branch of business, and his factory is at least the second of its kind in importance on this continent. Mr. Van Riper has invented or improved a large number of machines, and the speed with which a dog-wood pole is devoured by these "dogs of war" may well excite surprise. Roughing machines are made to despatch from 5,000 to 15,000 pieces per day; a finishing machine 20,000, and so on. Cotton, wool, silk, rope, and all other descriptions of bobbins are made at these works, and sent east, west, north and south. The number of employees usually ranges from 40 to 50. Two other shops in Paterson employ 15 hands each. One of these (John Cutler's) has been sixteen years in operation, and is prepared to fill orders of every kind in the line. This business was carried on for many years by Chauncey Andrews and Abm. Carter, previous to their decease.

The manufacture of plain and fancy woodwork for carpenters and builders is carried on very extensively by Andrew Derrom, whose establishment in West-street is now pronounced the most extensive of its kind in the neighborhood of New York. Mr. Derrom began business in 1845, and has since enjoyed an unusually prosperous career. The works, built up from a small beginning, are capacious and fitted with all the modern improvements, the whole being driven by a new steam-engine of 25-horse power. The boiler arrangements are of a superior character, combining economy with convenience. Each of the four stories in the main building is occupied by a distinct department of the business. In one the lumber is received, sawed up and planed at railroad speed; elsewhere it is prepared for housebuilding, or cut up into sashes, blinds, moldings, and the like. The consumption of lumber per annum is fully one million feet, besides large quantities sold to other parties. The works at present employ about 70 men and boys. To the self-sacrificing exertions of Mr. Derrom, in a great degree, the people of Paterson are indebted for their excellent system of public schools, which are probably unsurpassed by those of any city of equal size and population.

Wood type-making was introduced, in 1842, by Wells & Webb, who lately dissolved partnership, each prosecuting the business on his own account. Mr. Wells has lately added the preparation of box-wood for engravers, together with all sorts of printing materials. His office is at No. 120 Fulton-street, New York. The business now employs from 12 to 15 persons.

The manufacture of carriage-ware, such as hubs, spokes, felloes, &c., was commenced by Quackenbush, Hathaway & Holt, at their Empire works, in 1858. In the same building Wm. H. Goetschius is engaged on chair stock. Bone-turning is carried on by Frederick Hencke, and moldings made by Ackerman & Snyder. The total number of hands employed around these works is from 25 to 30.

Tanning has been prosecuted since 1825 by John P. Brown, who employs 10 men constantly, and has 60 pits in operation. Most of his ware is sent to Newark and New York for harness. Benjamin Geroe has also been several years in the tanning business, employing some half a dozen hands in all.

Harness-making and carriage-building have been mainly carried on for home market. About half a dozen parties are engaged in one or both, and employ from 50 to 75 hands. Peter Mercelis has for two or three years been making harness; and H. P. Fox has commenced building carriages for the outside world.

The tobacco manufacture was begun by S. Allen (now Allen, Reynolds & Co.) a quarter of a century ago, and gives employment to 35 hands. The product of their factory has an extensive sale in the neighboring country, and as far west as Chicago or Nebraska City.

Coffee-roasting and grinding, as a distinct business, is of more recent date, having been introduced by J. P. Huntoon in 1841. Since then Mr. Huntoon has applied himself very energetically, and built up an extensive trade, which extends as far west as the "father o. waters." The annual sales of coffee alone are 250,000 lbs. The Excelsior mill, built by Mr. Huntoon in 1855, is a large, neat and commodious structure, driven by steam, and keeping 10 or 12 persons at work. Mr Huntoon also laid the foundation of similar establishments in Newark and New Brunswick.

Soap and candle-making has been carried on since 1846 by A. Worth & Co., who have also built up a prosperous business. About 200 boxes of the former and 100 of the latter are made every week.

Brick-making is conducted by Van Blarcom & Co., and latterly by Westervelt & Scott, the total product being about five millions the present season. Van Blarcon & Co. have been nearly 20 years in the business, and send pretty largely to Bloomfield and Newark, as well as to Paterson.

John Bentley runs the only flour mill in the place, consuming about 250 bushels of grain daily, principally for the home market.

That whole section of the State is underlaid with beds of fine sandstone, extending to an unknown depth. At Little Falls these quarries, after having been worked so many years, are abandoned. Since 1852 the business has been successfully prosecuted near Paterson by Samuel Pope and by Hartley & Bradley. Mr. Pope's quarry employs from 25 to 30 men, and will yield this season about 8,000 tuns of stone for building purposes and monuments. This is delivered in Paterson, along the line of the Erie Railroad, and elsewhere. The Passaic county prison, a beautiful structure, was the first building of importance constructed of Mr. Pope's stone. The quarry has already been sunk to a depth of 90 feet, and will be continued probably an equal distance further, in order to allow a railroad to be laid down between it and the Morris Canal. The different layers of stone, from the surface conglomerate (once a sea beach) downward to the clear grit sandstone, are well worth a visit by the practical geologist.

The Paterson and Hudson River Railroad was chartered in January, 1831, and opened to the Bergen Hill junction in November, 1832; Philemon Dickerson (afterwards Governor of New Jersey), being the first president. Six years ago it was leased by the New York and Erie Company, who laid down a second track, and otherwise added to the facilities previously afforded. Their repair shop for the Union division, under the judicious management of Ezra Osborne, is located at Paterson, and employs 20 mechanics, besides laborers and others around the depot yard.

This series will not inaptly terminate by a short description of the Roswell House and adjoining grounds. Previous to 1837, the hill on which it stands was a naked mound of sand, extending in a continuous ridge nearly to the center of the town. At that time the late Mr. Colt began the erection of his magnificent mansion, which now adorns the summit, forming the first and most conspicuous object which meets the stranger's gaze. Along the precipitous sides of the hill carriage-ways and foot-paths have been constructed in every direction, now opening on the surrounding mountains, woods and fields; then on the bustling city, with its hundred factories; again on the noble edifice, flanked with greenhouses; and at other times on ponds where gracefully swim birds from the tropical climes, or graperies nestle, burthened with their luscious product. Through the liberality of the Colt family, these grounds have been thrown open to all well-disposed persons; and few visitors from a distance fail to feast their eyes on the scene, paying a merited tribute to the genius of Thom, whose "Tam o' Shanter" and "Souter Johnny," products of the Little Falls quarry, silently guard the entrance of the Roswell House.

P. S.—In a previous article, it should have been stated that the yarn and duck mills of Mr. John Colt, as well as Mr. Carrick's factory, ran throughout the crisis of 1837.

AN ASTRONOMICAL CLOCK.—There is in the town of Nantucket, Mass., an astronomical clock, made by Hon. Walter Folger, when he was only 22 years of age. The plan of the whole of its machinery was matured and completed in his mind before he commenced to put it together. It keeps the correct date of the year, and the figures change as the year changes. The sun and moon, represented by balls, appear to rise and set on the face of the clock, with all their variations and phases, as in the heavens. It also indicates the sun's place in the ecliptic, keeps an account of the motion of the moon's nodes around the ecliptic, and the sun and moon's declination.

A CURIOUS FACT.

At the time of the explosion on board the *Great Eastern*, a curious fact was noticed: those who were most hurt and who first died seemed the least injured when they first appeared above deck, and even were able to walk aft without assistance. On this point a writer in the *London Times* says:—

"A man blown up by gunpowder is a mere figure of raw flesh which seldom moves after the explosion. Not so with men blown up by steam, who, for a few minutes are able to walk about, apparently unhurt, though, in fact, mortally injured beyond all hope of recovery. This was so with one or two, who, as they emerged from below, walked aft with that indescribable expression in their faces only resembling intense astonishment; and a certain faltering of the gait and movements like one who walks in his sleep. Where not begrimed by the smoke or ashes, the peculiar bright, soft whiteness of the face, hands or breast, told at once that the skin, though unbroken, had, in fact, been boiled by the steam. One man walked along with the movement and look I have endeavored to describe, and seemed quite unconscious that the flesh of his thighs (most probably by the ashes in the furnace) was burnt in deep holes. To some one who came to his assistance, he said, quietly: 'I am all right, there are others worse than me; go look after them. The poor man was the first to die. He expired quietly as if falling into a refreshing sleep."

SYMPATHY OF THE NERVES.—When the nerves, from long habit, have become accustomed to transmit their messages from distinct parts, and are suddenly cut off from them, they will retain along their trunks the sympathetic or sensational actions. Thus, a man who has a leg amputated will feel distinctly along the course of the trunk of the nerve sensation from toes which no longer exist. The mind is also influenced by this; and frequently this peculiar direct nervous action can only be allayed by that which is negative and reflex. A curious instance occurred within my own experience. An old sailor suffered much from this. He retained his diseased foot too long, but at last consented to an amputation. I knew him with only a wooden leg. When he had his nervous pains he always called for hot water, into which he put his wooden stump. If told of his folly in supposing that such a proceeding could do any good, he would become enraged, and his paroxysm of pain would increase; but if gratified, he took things easy, and the process actually appeared to do him good, though all must know there could be no real benefit. Still, here is the effect of mind over matter.—*New York Medical Press.*

THE OKRA PLANT.—The consumption of this plant has materially increased within a few years. Mr. John Buckland, of Monmouth county (N. J.), now raises seven acres per annum. When the pods are in a fresh state, they are used for soup, and give off a mucilage which enriches the soup materially, while the less soluble portions of the pod are softened together with the seeds, and produce an admirable potage. The "gumbo" of the South is made with this plant. The soup is always easy of digestion, and very nutritious. When the plant is suffered to ripen, the seeds are large and hard, and the amount produced is very great; these by being burned produce an imitation of coffee, scarcely inferior to the best Mocha, while the fibrous character of the pod strongly recommends it to paper-makers. It is perfectly evident to those who have examined it, that neither the aloe, the beechwood, ordinary straw, or any of the substances now being made use of in place of cotton or linen for paper, can surpass it for this use; and we are surprised that it has not found its way into general consumption.—*Working Farmer.*

LEHIGH ZINC.—The first merchantable spelter, viz., three car loads, 25 tuns, were shipped, week before last, by the Pennsylvania and Lehigh Zinc Company, via North Pennsylvania Railroad, to Philadelphia. We learn that Mr. Wetherill has also shipped spelter both to New York and Philadelphia, in small lots, made by a process differing from that of the Pennsylvania and Lehigh Zinc Company, and said to be more expensive. The works of the latter company at Bethlehem are under the superintendence of Mr. Joseph Wharton, of Philadelphia.—*Mauch Chunk Gazette.*

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NOTES ON FOREIGN INVENTIONS

Gas-burners.—No better evidence could be afford of existing defects in gas-lighting apparatus than the continual rush of patents which issue in America and Europe for improvements in devices for regulating the flow of gas, increasing its luminosity, preventing flickering, &c. Joseph Desmet Seaut, of Mons, Belgium, has lately taken out a patent for rotary gas-burners, which contains several new features. The apparatus consists of a closed cup or vessel of glass or other suitable material, within which is a recipient containing water for purifying the gas on its passage from the main through suitable openings in a supply pipe to a rotating pipe, which is partly immersed in water. This latter pipe turns on a pivot, and is caused to rotate by the pressure of the gas in its passage through it, and communicates such rotary motion to the branches or burners in connection with it, which may be arranged in a spiral or other form, to produce ornamental gas-lighting.

Gas Regulator.—J. Skertchly, of Ashby-de-la-Zouch, England, has obtained a patent for regulating the pressure of gas. The invention consists in the construction of oscillating valves for regulating the supply of gas to the burners. These valves work in mercury, and are so arranged as to release on one side of their centers a corresponding amount of mercury to the displacement on the other. By this means the balance of the valve is maintained at a fixed weight, owing to the equilibrium or mercurial displacement. One side of these oscillating valves presents a larger surface to the action of the gas than the other, and by loading to the required pressure the side least exposed, the valve will remain stationary until the gas exerts a pressure superior to this load upon the more largely exposed side, which will cause the latter to descend into the mercury and the loaded side to rise out of it in the same proportion. By this action the admission of gas from the supply pipe is regulated. The apparatus also has a vertical action valve in a small inverted cup with slits or openings in its edge. The cup is surrounded with a solid or hollow ring of larger area than the gross section of the cup. The cup and ring are connected together, but a small space is left between them. The cup and ring thus connected float on mercury, and, being loaded to the desired weight, operate as follows:—Gas, being admitted through a pipe into the cup above the surface of the mercury, escapes through the slits or openings and rises between the cup and ring, and when the pressure of the gas exceeds the initial pressure of the valve, it acts on the large surface of the ring, pressing it down and carrying the cup along with it into the mercury; and as the slits or openings gradually descend beneath the mercurial surface, the supply of gas is proportionately lessened.

Making Glue.—J. L. Julion and J. Pirie, of Aberdeen, Scotland, have taken out a patent for obtaining gelatine in a solid form by a short process, from bones and integuments of animals. They crush the bones and other substances, after they are cleaned, and place them in a large tight vessel containing hydrochloric acid, where they are steeped and kept in vacuo until the acid dissolves all the phosphate of lime and earthy matters, leaving the gelatine separated. Hydrochloric acid has been used for obtaining the gelatine from bone, but not in vacuo, we believe. Its action is claimed to be more rapid and perfect by this mode.

Speed Indicator for Ships.—J. Tyssen, of Rotterdam, Holland, has secured a patent for an apparatus which is to show the rate of speed at which a steamship or any sailing vessel is moving through the water. A three-bladed screw is placed outside of the vessel, and on its axis is secured a wheel which gears into one or more wheels on shafts, to make one revolution when the vessel is running at the rate of 10 knots per hour, which is indicated on a dial, and so on for every rate of speed. The principle of the invention consists in giving to the screw a rotary motion by the action of the water at the vessel is driven through it.

Artificial Manure.—Great efforts have been made to manufacture a manure containing all the best qualities of guano, at a much less cost. The amount of $40, $50, and $60 per tun for guano is a tempting offer to invent a cheaper substitute. Various artificial manures have been patented, but none equal to the best guano. J. M. Stark, of Norwich, England, however, has lately taken out a patent for a new fertilizer which contains all the elements of guano and which he considers equal to it. It is made by submitting bones to the action of superheated steam, for the purpose of dissolving them, after which they are incorporated with hydrochloric acid, muriate of ammonia, and some potash. The fertilizer is called "Chrondrin Bone Manure." As the ammonia is the most expensive element of manure, of course, if it could be obtained cheap, we should not be dependent on the Peruvians for our guano. This is the quarter for investigation and experiment—cheap ammonia.

AWARD OF MEDALS BY THE AMERICAN INSTITUTE.

By the favor of W. B. Leonard, Esq., the Corresponding Secretary of the American Institute—who, by the way, is the only acting officer of that body who manifests anything like a commendable degree of enterprise—we have at last received a portion of the list of exhibitors who received the higher grade of awards at the late fair. In a note accompanying the list, the secretary says: "Herewith you have a list of all the premiums which the committee have passed upon; a few other reports are still in the hands of the judges, who will send them to us as soon as the premiums are fixed by the Premium Committee.

It will be observed, from the above extract, that, although the exhibition closed two weeks ago, yet the judges have not all reported on their respective classes. This is characteristic of the enterprise with which the American Institute is conducted. We have none but the best of feeling towards the institution, and many of the managers and officers are our own personal friends; but, as public journalists, we deem it it our duty to condemn the sluggish manner in which the affairs of the association are managed. We do this, however, with no other motive than to bring the officers to their senses, hoping that a reform in the management may be the result. No one, we believe, can justly accuse the managers of the slightest dishonesty of purpose, and we would not intimate any deficiency in the management, except the one of slothfulness, and, perhaps, frequently, a lack of judgment in the selection of competent persons to act as judges in the award of premiums; but with this, at present, we have nothing to do. In future, we trust that an increased activity will be observed in conducting the affairs of the American Institute, which now has a well-merited reputation for respectability; the element which it most needs to make it the leading institution of its kind in the country, is vigor; and we sincerely hope to see this ingredient yet distilled into it. Previous to the opening of their next annual fair, we may take occasion to give the managers some hints on the best way of getting-up and conducting their exhibitions; feeling confident that if our hints are heeded, they will find their treasury enriched, instead of depleted, by their exhibitions, and, at the same time, they will render better satisfaction to the exhibitors.

In presenting the following list, we confine our report to the Mechanical Department; and in this section, we publish only the list of award of medals—gold, silver and bronze; we omit the list of awards of diplomas from want of room. It is a rule of the American Institute to grant only *one* medal of the same class for a machine, however many times it may be exhibited; this explains the fact of some new machines receiving medals while others, of equal merit, to which medals had been awarded in former years, have received only diplomas, which, of course, are not mentioned here. We wish we had space to comment on all the inventions which have received premiums at this fair; but so much other important matter is crowding upon us, now-a-days, that we have not the room to insert the half of the interesting scientific and mechanical items of intelligence which are sent to us. When we publish the remainder of the list of awards in the Mechanical Department, however, we hope to be able to elaborate somewhat, editorially, on the nature of many of the inventions for which premiums were given.

It will be observed that most of the machines adjudged worthy of the higher class of premiums have already been illustrated and described in the SCIENTIFIC AMERICAN.

RAILROAD MACHINERY.

C. A. Smith, Piermont, N. Y.: "Reclining Car Seat."—Silver medal. [A full-sized car seat can be seen at the office of the SCIENTIFIC AMERICAN.]

W. L. Childs, Piermont, N. Y.: "Reclining Car Seat."—Bronze medal. [See engraving on page 340, Vol. XIV., SCIENTIFIC AMERICAN.]

Levi Bissell, 147 Wooster-street, New York: "Locomotive Truck."—Large silver medal.

New England Car Spring Company, 61 Chambers-street, New York: "India-rubber Car Springs."—Bronze medal.

W. S. Platt, New York: "Anti-friction Journal."—Silver medal.

MACHINERY FOR WORKING IRON.

Thos. Prosser & Son, 28 Platt-street, New York: "Boiler-makers' Tools."—Silver medal.

MACHINERY FOR WORKING WOOD.

J. M. Greenwood, Rochester, N. Y. (D. R. Bowker, agent, No. 5 West Twenty-fourth-street, New York): "Head-turning Machine."—Silver medal. [See engraving in No. 20, present volume, SCIENTIFIC AMERICAN.]

S. M. Hamilton, Baltimore, Md. (Tice, Grosvenor & Brother, agents, corner of Twenty-eighth-street and First-avenue, New York): "Variety Molding-machine."—Large gold medal. [An engraving of this machine appears on the first page of this number.]

Kaefer Power Company, Harlem Railroad Building, New York: "Mortising, Boring, and Circular and Scroll-Sawing Machine."—Large silver medal. [See engraving in No. 15, present volume, SCIENTIFIC AMERICAN.]

B. E. Parkhurst, 114 Third-avenue, New York: "Portable Timber, Board, Siding and Lath-sawing Machine."—Large silver medal.

H. D. Stover, 13 Platt-street, New York: "Wood-shaping machine."—Large silver medal.

Wm. M. Cassidy, Albany, N. Y.: "Huntoon's Machine for Carving Wood."—Silver medal.

Seeley & Chism, 34½ Pine-street, New York: "Shingle Machine."—Silver medal.

Gray & Woods, Boston, Mass.: "Machine for Planing Straight and out of Wind."—Silver medal. [An engraving of this machine will appear in the SCIENTIFIC AMERICAN in a few weeks.]

STEAM PUMPS, GAGES, VALVES, LUBRICATORS, &C.

John Sutton, 114 Cannon-street, New York: "Floating Heater and Evaporator."—Bronze medal. [An engraving will be published in this journal in a few weeks.]

A. W. Tupper, Milford, Mich.: "Adjustable Union Joint for Water, Steam, Gas, &c."—Silver medal.

Charles J. Porter, 235 West Thirteenth-street, New York: "Governor to Regulate the Speed of Steam-engines."—Silver medal. [An engraving of this excellent invention will be found on page 36, Vol. XIV., of the SCIENTIFIC AMERICAN.]

W. D. Andrews, 414 Water-street, New York: "Centrifugal Pump for Wrecking, &c."—Gold medal.

PRINTING-PRESSES, &C.

Edward Burroughs, Rochester, N. Y. (S. A. Heath & Co., agents, 37 Park-row, New York): "Paper-cutting Machine."—Silver medal. [See engraving in No. 15, present volume.]

SEWING-MACHINES.

1. Shuttle or lock-stitch machines for family use and light manufacturing purposes:—

M. Finkle & Lyon, 503 Broadway, New York: "Sewing-machine."—Large silver medal.

Ladd, Webster & Co., 500 Broadway, New York: "Sewing-machine."—Silver medal.

2. Shuttle or lock-stitch machines for heavy and general manufacturing purposes:—

First & Frost, 171 Suffolk-street, New York: "Sewing-machine."—Large silver medal.

M. Finkle & Lyon, 503 Broadway, New York: "Sewing-machine."—Silver medal.

Ladd, Webster & Co., 500 Broadway, New York: "Sewing-machine."—Bronze medal.

3. Double chain-stitch machines for family use and either light or heavy work:—

Grover & Baker Sewing-machine Company, 501 Broadway, New York: "Sewing-machine."—Large silver medal. [See engraving in No. 2, present volume, SCIENTIFIC AMERICAN.]

Merrill & La Croix, 413 Broadway, New York: "Sewing-machine."—Silver medal.

I. A. Bigelow, 421 Broadway, New York: "Sewing-machine."—Bronze medal.

MISCELLANEOUS INVENTIONS.

Norman Wiard, Janesville, Wis. (also, of 69 Broadway, New York, room 35): "Steam Ice Boat."—Silver medal.

Ransom Crosby, Newark, N. J.: "Miter Machine."—Bronze medal.

Alexander & Ritchie, Williamsburgh, N. Y.: "Improvement in Making Patterns."—Silver medal.

GAS APPARATUS.

Herts, Levy & Alexander, 23 Liberty-street, New York: "Werner's Gas Apparatus for Generating Gas from Wood."—Large silver medal.

J. D. Moore, 80 West Nineteenth-street, New York: "Portable Gas-works for Making Gas from Fat, Rosin and Rosin-oil."—Silver medal.

COTTON AND WOOLEN MACHINERY.

Downes & Co., Seneca Falls, N. Y.: "Knitting-machine adapted to Various Kinds of Work."—Silver medal.

J. B. Aiken, Manchester, N. H.: "Knitting-machine for Plain Work."—Large silver medal. [An engraving of this machine may be found on page 39, Vol. XIV., of the SCIENTIFIC AMERICAN.]

STEAM-ENGINES.

J. C. Hoadley, Lawrence, Mass.: "Portable Steam-engine."—Large gold medal.

L. C. Ward, Fishkill, N. Y.: "Portable Steam-engine." (manufactured by the Fishkill Landing Machine Company)—Large silver medal.

Paynes & Olcott, Corning, N. Y.: "Portable Steam-engine."—Silver medal.

Todd & Rafferty, Paterson, N. J.: "Stationary Steam-engine."—Gold medal.

C. A. Schultz, 257 Seventh-street, New York: "Stationary Steam-engine."—Large silver medal. [An engraving of this engine may be found in No. 13, of the present volume of the SCIENTIFIC AMERICAN.]

Manhattan Steam Fire-engine Company, New York: "Steam Fire-engine."—Gold medal.

Thos. Prosser & Son, 28 Platt-street, New York: "Steam-boiler and Condenser."—Silver medal.

METAL MANUFACTURES.

Fuller, Lord & Co., 139 Greenwich-street, New York: "Hot-pressed and Punched Nuts."—Silver medal.

Damascus Steel and Iron Company, 71 John-street, New York: "Cast Steel."—Large silver medal.

D. B. & G. H. Bruen, Newark, N. J.: "Malleable Iron."—Bronze medal.

Jones & Louth, Pittsburgh, Pa.: "Rolled Shafting."—Large silver medal.

MATHEMATICAL AND PHILOSOPHICAL INSTRUMENTS.

Henry W. Trimble, Newark, N. J.: "Platform Hay Scales."—Large silver medal.

John Howe, Jr., Brandon, Vt. (office in New York, 203 Broadway): "Hay Scale."—Silver medal.

John Howe, Jr., Brandon, Vt.: "Scales."—Bronze medal.

A. Wilson, No. 4 Wall-street, New York: "Electric Gas-lighting Machine."—Gold medal.

S. Gardiner, Jr., 167 Broadway, New York: "Electric Gas-lighting Apparatus."—Silver medal. [An engraving of this invention may be found on page 320, Vol. XII., SCIENTIFIC AMERICAN.]

Ryerson & Huested, 218 West Thirty-fifth-street, New York: "Submarine-explorer."—Gold medal.

J. M. Grumman, 377 Fulton-street, Brooklyn, N. Y.: "Surveyors' Chain."—Bronze medal.

Jabez Burns, 245 West Twenty-ninth-street, New York: "Adometer."—Bronze medal.

Joseph Grice, 96 Wall-street, New York: "Marine Salinometer."—Bronze medal.

MACHINE BELTING.

1. India-rubber:—

New York Belting and Packing Company, 37 Park-row, New York: "India-rubber Machine Belting."—Silver medal.

2. Leather:—

Hoyt Brothers, 28 Spruce-street, New York: "Leather Machine Belting."—Silver medal.

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WEEKLY SUMMARY OF INVENTIONS.

The following inventions are among the most useful improvements patented this week. For the claims to these inventions the reader is referred to the official list on another page.

DRAWING FRAMES FOR COTTON &C.

This invention consists in a certain mode of applying weighted levers in combination with bars suspended from the saddles of the top rolls, whereby a single weighted lever is or may be made to apply the pressure to a complete set of top rolls at both ends thereof, instead of four as required by the common method of applying the pressure. It further consists in a certain method of relieving the saddles of the action of the weighted lever to such an extent as to permit the removal of the top rolls, without taking off the weight from the lever. The inventor of this device is N. E. Hale, of Nashua, N. H.

PROJECTILES FOR RIFLED ORDNANCE.

Much difficulty has heretofore been experienced in the use of rifled ordnance, from the want of some effective method of making the projectiles fit the grooves of the piece in such a manner as to cause a rotary motion to be imparted to them. In the use of naked projectiles, with fins or grooves of the solid metal, or of projectiles with bands cups, or casings of iron, the grooves of the gun are rapidly worn out, and in the use of projectiles with bands or casings of lead or other soft metals, much inconvenience is experienced from the "leading" of the grooves. J. W. Cochran, of New York, has obtained two patents this week for inventions to obviate this difficulty

The first of these inventions consist in the application to a projectile of cylindrical or partly cylindrical form, of a covering or of one or more bands, formed of a coil or coils of wire, of copper or other tough and ductile metal, wound around the whole, or around a portion or portions of the cylindrical part of the projectile. The wire thus applied being caused to stretch in the direction of its length, either by the driving of the projectile into the grooved portion of the bore of the piece, or by the expansive action upon an inner shirt of soft metal, of the gases evolved by the explosion of the charge, is caused to enter and fill or fit the grooves in such a manner as to insure the rotary motion of the ball.

The other consists, firstly, in the use, in combination with a cup or cup-like frame of wrought iron or other tough metal attached to and projecting beyond the rear of an elongated or partly cylindrical projectile, of a band formed by winding copper-wire or wire formed of other tough and ductile metal, or alloy, round the exterior of such cup or frame; such band being intended to be stretched by the expansion or spreading out of the cup or frame produced by the explosion of the charge, and so caused to fit or enter into the grooves of the gun. It consist, secondly, in furnishing the projectile with an expanding ring of copper, brass, or other suitable ductile metal or alloy, not too soft to "lead" the grooves, fitted to a conical surface formed behind a shoulder on the front part of the projectile. This ring has an external diameter not larger than the bore of the gun, and fits easily upon the smaller part of the conical surface when in its normal condition, but, after having been expanded to such a degree as to fit tightly to the bore by driving it back upon the conical surface, it is caused to derive a further expansion to make it enter the grooves, by the action of the cone within it, when the projectile is started in the discharge of the gun, and thus is made to assist in preventing windage and in securing the rotary motion of the projectile, and also to steady and prevent the vibration of the front part of the ball during its passage out of the gun,

TRACTION ENGINE.

This invention consists in a peculiar means employed for regulating and applying the power to the driving-wheels of the engine, whereby the latter may be readily turned and guarded, and placed more fully under the control of the engineer or attendant than usual. The inventors of this device are R. Carkhuff and B. Chalfant, of Lewisburgh, Pa.

LIGHTING RAILROAD CARS BY GAS.

This invention consists in arranging a series of gas burners in a railroad car, and supplying gas to the same from a portable gasometer set in one corner of the car. The connection is formed by a flexible tube, which allows the gasometer (which has flexible sides) to descend as the gas is consumed. To supply the gasometer with gas, it is disconnected from the main pipe of the burners and carried to the gas-works. This appears to be a good plan for lighting railroad cars and traveling vehicles generally. This improvement was designed by Messrs. Albright & Miller, of Grafton, Va.

STEAM-ENGINE.

This invention consists in making the piston-rod, piston, and cylinder of oscillating horizontal engines, square or many-sided, and by this construction the objections to cylinders with round bores are obviated. In the use of a round piston and a cylinder having a circular bore great inconvenience is experienced from the bore wearing untrue or elliptical; resulting in horizontal engines from the gravity of the piston, and in oscillating engines both from the gravity of the piston and the reciprocating action of the unguided cylinder. When a cylinder wears thus, no packing ring will compensate for the wear. By the use of the angular or square-sided sections for packing, corresponding with the square sides of the cylinder &c., the difficulty is obviated. The credit of this invention is due to James Cumming, of Boston, Mass.

WATER METER.

We had occasion, a few weeks since, to call the attention of the public to a water meter invented by Mr. B. S. Church, of Manhattanville, N. Y. Since that time Mr. Church has made several valuable improvements on his meter, and he has now obtained a second patent on the same. The object of these improvements is to prevent the escape of the air from the air-chamber, and also to to give a warning to the inmates of the house, if the correct operation of the meter is interrupted from any cause. By this meter the water is measured independent of the head or pressure to which it may be subjected, so that it never fails to give a correct result. The inventor will be happy to furnish further information about it.

AUTOMATIC GATE.

This invention relates to that description of gates which have mechanism connected to them capable of being actuated automatically by the passing along of a vehicle, or manually by a person within the same, or on horseback, for the purpose of opening and closing the gate. The invention consists in a novel way of constructing the gate, and in the arrangement of mechanism connected therewith, whereby a very simple and efficient operating mechanism is obtained for the intended purpose. This contrivance is the invention of N. J. Waterbury, of Fond du Lac, Wis.

APPARATUS FOR PRINTING ADDRESSES ON NEWSPAPERS.

With this machine the names and post-offices of subscribers to a newspaper are printed on the wrapper of papers, successively, by means of a traveling chain of lettered links or stencil plates. The chain unwinds from one roller on to another in scroll manner; and as it unwinds, each link is furnished, by a peculiar device, with ink. The papers are fed into a hopper and carried under an impression stamp and over the inked links, singly, by means of an ingenious feeding-contrivance; and at proper time the stamp descends and causes the wrapper of the paper to be superscribed. An ingenious arrangement of bands, with all the post-offices of certain States and the names of the several States, marked on them, is combined with the superscribing-device; thus, by the aid of an assorting mail-box all the papers of subscribers belonging to a certain post-office are discharged into separate piles. The whole operation of inking the chain, feeding the papers, producing the impression, and assorting the papers of different post-offices, is automatic. This is certainly a very ingenious machine, and if, on trial, it should work satisfactorily, it is destined to create a revolution in the mailing department of large printing-offices. The inventor of this device is Rev. C. K. Marshall, of Vicksburgh, Miss., and his claims were published in the last number of the SCIENTIFIC AMERICAN.

LIQUID QUARTZ.—We have received an interesting letter from Henry O'Rielly, Esq., in reference to the discoveries made by Dr. Benjamin Hardinge, of this city, in the "liquefaction of quartz rock;" but in consequence of a great press of other matter, we are obliged to defer its publication till next week.

FILE-CUTTING MACHINE.

MESSRS. EDITORS:— In the SCIENTIFIC AMERICAN of Oct. 29th, I saw a favorable notice of a file-cutting machine, said to be the invention of one M. Bernot, of Paris. Whoever will be at the pains to look into the Patent Office Report, for 1855, page 310, will find the claim and an abstract of the specification of a machine possessing essentially the same elements as the one exhibited by M. Bernot. On page 39 of the illustrations will be seen an engraving of the machine, as constructed by Horace Hotchkiss, and by him patented. All that is really distinctive, new, and useful in the machine was originated by me in 1852-53, and named by me "The Non-recoil Lightning File-cutter." It performed admirably. After vainly trying in the great New England metropolis for means to make a business of file-cutting, I sold the machine to Mr Hotchkiss for a nominal sum. He made, to the order of an extensive steel-manufacturing firm, several machines which were sent to England and gave such satisfaction that the same firm subsequently engaged him and several American operatives to proceed to England and construct machines for an extensive establishment. Such machines are in operation at this time and pay largely. Some of the very intelligent gentlemen who could not find time to examine the merits of the invention, and did not wish their repose broken in upon by a *patent adventurer*, have since purchased great quantities of files cut by these machines, a fact they are as innocently ignorant of as Messrs. Greenwood and Bernot are to-day. Of late years I have become somewhat accustomed to hear the echo of my humble thunder from abroad, without serious disturbance. I can afford to be generous, though poor, but there are reminiscences connected with this matter of more than usual interest to me, which have prompted this communication. If our Patent Office reports and the SCIENTIFIC AMERICAN were more extensively circulated and read in the European countries, it would change their opinion in regard to the *originality* of many inventions, though it might tend to reduce the number of patents; and it would add wonderfully to the stock of knowledge already acquired. D. H. C.

West Roxbury, Mass., Oct. 31, 1859.

PATENT CURTAIN ROLLERS:—A somewhat long trial was concluded before Judge Sprague of the U. S., Circuit Court, Boston, on the 18th inst. The plaintiff was Benjamin Bray, of Salem, Mass.; the defendant Jacob Hartshorn, of Boston. The suit was instituted to recover damages for the infringement of plaintiffs patent for an improvement in curtain-fixtures, consisting of a hollow roller, a long spiral spring adapted to it, and a weight, for the purpose of balancing the curtain in any position in which it might be placed. The defendent had made and sold 5,000 of the fixtures complained of; but it was contended that they were different from those of the plaintiff and were an improvement upon his. The plaintiff, through his counsel, stated to the jury, that he did not seek to recover damages adaquate to the injury complained of, but only a small sum for the purpose of establishing the validity of the patent. The jury found their verdict in favor of the plaintiff, and assessed damages in the sum of $500.

THE LARGEST GATE IN THE WORLD.—A monster gate for the Sault St. Maria Canal has just been completed at Newport, Mich. It is 82 feet wide (that being the width of the canal), 21½ feet deep, and 32 inches thick. The timber used for its construction, cut into inch boards, would measure about 120,000 feet. It is believed to be the largest gate in the world. Its weight from the immense quantity of iron attached to it, will throw all competitors in the shade, their being about 40 tuns used in binding it. The master-builder of the wood work (which is oak) is Stewart McDonald.

A SINGULAR ACCIDENT.—An accident occurred on board the steamer *Mt. Vernon*, running between Baltimore and this city, whereby one of the crew, Andrew Colt, came near loosing the front half of each foot. He leaped from the deck into the hold, in order to assist in unloading, and alighted upon a roller of a Woodworth plaining-machine, a part of the freight, which had been shipped without a casing, when the roller turned and brought a cutting-bit upon both his feet, passing through his boots and taking one foot nearly off behind the great toe joint, and cutting the other seriously, but not quite so deep,

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CORAL FORMATIONS.

Hills have been leveled, valleys filled up and cities built by the might of man, and his works have been justly considered as great and mighty productions. But if man has built proud cities, he may justly feel humbled in comparing his works with the little coraline insects of the sea, who have built islands in the deep ocean with no other material for their walls than the matter held in solution by the waters. Coral is a stony product of the sea resembling the productions of the garden, rivaling trees and shrubs in the gracefulness and delicacy of their forms. In olden times it was believed that coral was a petrified vegetable production, as it was well known that vegetation could produce stately forests and minute plants and when it was first suggested that it was the work of little jelly-like animals, by the naturalist, Peysonnel, in 1751, scientific men pronounced the idea absurd. It is well known that coral is the stony frames belonging to coraline insects, and a piece of it may be said to be composed of millions of their skeletons. We have received a large specimen of this marine marble flora, sent to us by Geo. E. Harkness, engineer of Fort Jefferson, Fla. It is of the kind found at the Tortugas Islands, and is very beautiful, branching out into broad leaves, rivaling in their thin tracery the works of the most skillful sculptors. Coral is principally composed of lime; the insects secrete it from the waters of the sea, and as each generation expires, its successors continue the building until it arises from the ocean as floral rocks and islands. The operations of these marine insects are principally confined to the warmer waters of the ocean, such as in the Gulf of Florida and the Indian and Pacific oceans. It is remarkable that, at 50 miles back from the seacoast, in the Carolinas, as perfect specimens of coral are frequently dug from the marl pits as those obtained fresh from the sea. The limestone of New Jersey and of Missouri give evidence of their coraline origin, thus affording proof that many extensive tracks of this country were once under the waters of the great deep, and that these little creatures were the builders of many of the rocks and much of the dry land. But the coral insects perform another great office besides increasing the boundaries of the land. It is well known that silica, lime, magnesia, alumina, oxyds of iron, and other soluble impurities, are carried down into the ocean by the waters from rivers. The little coralines act the part of scavengers of the sea, as they secrete only the impurities and refuse the salts of sodium, and thus they build their houses from the very materials which otherwise would accumulate and render the ocean waters as bitter as those of the sea of Sodom. The coral insects and marine shell-fish store away the excess of lime water in the sea and tend to purify its waters, in the same manner that trees and vegetation absorb carbonic acid from the atmosphere and keep it pure for the welfare of man. It is thus that the operations of nature are conducted upon a wise, simple and sublime plan by the great Author of Creation.

SPONTANEOUS COMBUSTION OF SAWDUST.

The following are extracts from a communication of E. N. Horsford, Professor of Chemistry at Cambridge, Mass., on the spontaneous combustion of sawdust containing oil, by which it is said the Mechanical Bakery in Boston was burned down. The letter is addressed to the Boston *Journal*:—

"In a communication under date of Feb. 28th, the writer presented to your readers an argument in favor of the theory of spontaneous combustion, as a source of the fire which destroyed the Mechanical Bakery. Not the least of the considerations which led to the communication, was the wish to relieve the minds of parties interested from the suspicion that the fire was the work of an incendiary. At the time, the argument seemed to the writer sufficiently sound. It required, what was suggested in a concluding paragraph, an experiment where the circumstances of temperature, time, &c., should be as nearly like those in the Mechanical Bakery as might be. The reproduction of all the conditions in a parallel experiment was not an easy matter, and has not been attempted by the writer. But the experiment even has been rendered unnecessary by actual occurrences. The writer has learned that a machinist of long experience (whose address is herewith inclosed) has, in repeated instances, observed the spontaneous combustion of boxes of sawdust saturated with oil, in half an hour after they were taken down and broken up out of doors. The differences between the facts witnessed by him and what it is conceived occurred in the bakery are these: In his case, the sawdust had been long in use, and having become no longer serviceable as an absorbent, was broken up and more perfectly exposed to the air. In the bakery the sawdust had been but a short time in use, and was still quite porous. In the case of the bakery, the heat of the atmosphere about the box of sawdust, and, of course, of the sawdust itself, as well as the air within it, was high. In the other case, it is probable that the heat from without was much lower. It is conceivable that the heat from without, in the one case, was quite an equivalent for the more perfect saturation and more thorough disintegration in the other.

"In addition to the experience of the machinist above mentioned, and this result of experiment in confirmation of the suggestion in the communication of February last, the writer has translated and presents the following extract from a recent report of Professor Balling, of Prague, published in the April number of the *Polytechnisches Centralblatt*. A case of inexplicable conflagration had been submitted to the learned professor by the authorities of the city. A velvet factory had been repeatedly burned to the ground under circumstances precluding suspicion either of carelessness or intentional firing. The report says: 'It is a well known fact that fatty oils exposed to the air absorb oxygen and become more or less heated. The greater the surface with which the air comes in contact, the greater is the absorption of oxygen and the greater the heat produced, until, at length, such is the increase of temperature, that spontaneous combustion of the body saturated with oil takes place. By employing new oil, and by warming from without, the inflammable condition is expedited, and the burning made more violent. In this way many conflagrations have already taken place, especially in woolen spinneries, in which the spun wool previously charged with oil was gathered in heaps, and where the waste wool was left in baskets. The same has occurred in carpenter's shops, where, in polishing furniture, the surface is first saturated with oil and then the excess rubbed off with shavings. The shavings absorb the surplus oil, and, where remaining in piles, spontaneously take fire.' The report goes on to say that, in view of these considerations, there was nothing new in the case of conflagration before them; and it closes with instructions obviously suggested by the facts presented, that where it is necessary to saturate with oil bodies like sawdust, shavings, cotton or woolen waste, care should be taken to avoid accumulation in heaps.

"The writer, now after the lapse of nearly three-quarters of a year, cannot escape the conviction that it is fairly probable that the burning of the Mechanical Bakery was a case of spontaneous combustion."

THE CEREALS OF THE UNITED STATES.

A statistical view of American agriculture, recently given in an address delivered by Mr. John Jay before the American Geographical and Statistical Society, in this city, gives a rather discouraging account of the progress of our national agriculture. In many staple products, the quantity raised has shown a marked decrease in 1850 (the date of our last census, from which Mr. Jay has obtained most of the purely statistical portions of his work), from that raised in preceding years. Until the census of 1860, there can be no means of obtaining further statistics of the kind; and unless there has been a marked improvement during the last seven years, the condition of our agriculture is not very promising. So far as concerns the wheat crop, the New York *Evening Post* considers that, although it has not decreased in its actual amount, it has not increased in proportion to the increase of population. In New England, its culture is rapidly declining; while, in the middle States, it if nearly stationary; and our chief supplies now come from the north-western district. In New York, the crop in 1840 was over 12,000,000 of bushels, while in 1850 it was but 9,000,000; a decrease of 25 per cent. With regard to the products of the entire country, without alluding to any particular State, we find that rye, oats, Irish and sweet potatoes, hay and tobacco have steadily decreased. Hops have increased at the rate of 500 per cent., owing to the enormous consumption of beer; rice has increased at the rate of nearly 300 per cent. In 1840, the cotton produce amounted to 800,000,000 lbs.; in 1850, to 980,000,000; in 1855, to 1,200,000,000; thus the great staple production of the United States far surpassing in amount even our famed wheat, cotton and tobacco—is Indian corn. Its cultivation has retrograded in no State, and the crop may be roughly estimated at 400,000,000 of bushels in 1840, 600,000,000 in 1850, over 700,000,000 in 1855, and fully 800,000,000 in 1856. The corn crop is said to be somewhat deficient this year, but the wheat has been so abundant as to make up the entire deficiency.

THE POTATO BUG.

On page 408, Vol. XIII., of the SCIENTIFIC AMERICAN, we published an illustrated description of the potato bug, with a full account of its habits. It was afterwards denied that the potato rot was caused by insects, and so the matter was left for future experiments, according to our recommendations. In a late issue of the Cincinnati *Gazette*, a correspondent confirms the insect theory of the potato rot. He says:—

"The potato bug has committed its ravages extensively. This destructive pest is increasing from year to year, because it is not destroyed, and farmers make no effort at limiting its numbers. Birds and poultry, and nothing else, will destroy it, for it belongs to the *cantharides* or blistering-bugs. In Indiana I have met with two kinds, the yellow-striped and the ash-colored, but near Pittsburgh, Pa., I recently saw a small and black variety. Here the yellow-striped is the most destructive, for it appears in myriads. The ash-colored is a large variety, comes earlier and disappears later than the yellow-striped, but, being few in number, cause no material injury. The black variety is more numerous than these, but we have not seen them in sufficient numbers to be formidable. These bugs appear about the middle of July and remain from two to three weeks. They then go into the ground, deposit their eggs, and die. In three or four weeks the eggs are hatched, producing a slender, yellowish-colored grub, with a reddish head, and having six legs. These live upon fine roots, and in the ensuing year change into bugs which live upon the leaves of several plants, but especially upon those of the potato. When numerous, they will cover every leaf of many hills, and eating enormously, they soon go over a moderate-sized patch. This year they consumed for us a fifth of an acre in about two days. Hence, at the time of their appearance, the farmer should daily examine his potatoes. To keep down their numbers the bugs should be destroyed, for then they will not lay eggs for a next year's swarm. The most effectual method to do this is to take a pan half full of water and pour turpentine into it until it is about one-eighth of an inch thick. Put this basin under the vines with the left hand, and with the right hand brush the bugs into the basin. The turpentine will kill them immediately, and when the water will hold no more, sprinkle bugs and all over the vines. The scent of the turpentine is extremely offensive to them, and a knowledge that many of them have been destroyed frightens them away. Pursue this course three times a day, and in a day or two they will disappear. I tried the turpentine for the first time this year, and made but one visit to the patches. The next day I had to leave on a journey, and returning three weeks after, found no further injury done, and the leaves which had been eaten had again grown out. The turpentine did not injure the vines."

A LIGHT AND POWERFUL LIFTING JACK.—We have just raised 16 pigs of lead, weighing 2,178 pounds by means of a jack which weighs 1 lb. 11½ ounces. We saw the jack weighed ourselves, and the weight of the lead we received from John W. Quincy & Co., No. 98 William-street, this city. The jack was made by David L. Miller, of Madison, N. J., in accordance with his invention which was illustrated on page 148, Vol. XIV., SCIENTIFIC AMERICAN. Mr. Miller informs us that he has received about ten letters per day since our previous notice, last January; and we hope not less favorable results may flow from this, for we like to see the makers of really good implements find an extensive sale for them, and we have never known an instance but what they did, if they had machines of merit, and availed themselves of the medium of the SCIENTIFIC AMERICAN for bringing them before the public.

THE WAY TO DO IT.—We learn from E. A. Smead, of Tioga, Pa., that he has sold over ten thousand dollars' worth of rights of his device for changing motion (illustrated on page 236, Vol. XIV., SCIENTIFIC AMERICAN) for its application to churns alone.

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A LARGE PLANETARIUM.

A very large planetarium has recently been constructed by Mr. N. B. Jewett, of Haverhill, Mass., and we have been informed by a correspondent that several scientific men have examined it, and pronounced it a very complete apparatus of the kind. It occupies a space sixteen feet in diameter, and the sun, sixteen planets, and nineteen satellites are represented upon it. The center stand, which supports the whole, is six feet in diameter, and made of rosewood and mahogany. This stand is supported by four legs, and there is a circle representing the orbit of the earth, and upon which is a railroad track bearing a small car carrying two spheres or globes representing the earth and the moon. Mechanical devices are applied and arranged to give them their proper motions, the earth making 365¼ revolutions while moving round in its orbit, with an arrangement showing the leap year. The pole of the earth points in one direction at an inclination of 23½ degrees to the perpendicular, and the moon makes her periodic revolution round the earth, and shows all its different phases.

The motions of the other planets are produced as follows: In the center of the earth's orbit, there is a perpendicular shaft, at the foot of which is attached a gear wheel, and there is also a series of hollow tubes on this shaft with a gear wheel at the foot of each, to give the correct motion to each planet. At the one side of the independent wheels on the tube shafts, there is a counter shaft, on which is a corresponding number of stationary wheels having the requisite number of teeth to give the wheels on the several tube shafts their proper motions. A horizontal arm extends from each tube, on which is a planet having its orbit situated at the proper distance from the other planets and sun, the latter being represented by a large sphere on the center shaft. The whole machinery is put in motion by a small crank handle placed at the end of the horizontal shaft connected with the main wheel, and the arm that moves the car which supports the earth and moon. It is a beautiful piece of mechanism, and, so far as we know, is the largest planetarium in our country, excepting perhaps the famous one of Rittenhouse, at Princeton College, N. J.

THE CONDITION OF APPLICATIONS AT THE PATENT OFFICE.

In our Washington letter (published on page 321 of our last issue) reference is made to the general good condition of the Patent Office. There is at present no very great accumulation of cases in any one department, with the exception of Class IV., which includes the following subjects, arranged in the order of the number of applications now made; the first being the most numerous:—

1. *India-rubber and Gutta-percha;* modes of treating, and fabrics, manufactures and compositions thereof.
2. *Gas;* apparatus, modes and materials for making.
3. *Surgical Instruments;* and methods, modes of preparing drugs and medicines, &c.
4. *Manufacture of Sugar and Salt;* apparatus and method therefor, including evaporation, &c.
5. *Coal Oil;* apparatus and method for making and purifying.
6. *Miscellaneous Chemical;* relating to almost every department of the arts.
7. *Vapor Lamps and Burners.*
8. *Hides and Leather;* treatment and preparation of, including tanning, &c.
9. *Oils, Fats, Soaps, Candles;* purification, treatment and manufacture of.
10. *Alcohol and Alcoholic Liquors, Beer, &c.;* including fermentation and distillation.
11. *Food;* preservation and preparation of.
12. *Paper Stock and other Fibrous Materials;* modes of preparation and treatment of.
13. *Dyeing, Bleaching, Calico-printing, &c.*

There are many cases in this class not yet acted upon. This arises solely from the fact that the acting Chief Examiner has been kept from his post by severe sickness; and thus, for a number of weeks, the care of this interesting department has devolved upon his assistant, who, though he has performed his duty nobly, has not been able to dispose of all the cases which have been presented for examination. The Chief Examiner is now gradually resuming his duties, and we may soon expect to see the usual efficiency in his department.

HOME PATENT AGENTS.

J. S. Colvin, of Pittsburgh, Pa., under date of Oct. 29th, says:—"I have just received the Letters Patent on my Gasket, and thank you for your prompt attention." He sends a model of another invention from another party, to which he alludes in the same letter, and says:—"I have obtained this case for you as a reward for your promptness in my other business, as the other party in interest was in favor of a *home* agency, on the ground that he could explain the nature of the invention better personally," &c.

We give the above extracts as a basis on which to make a few remarks concerning *home patent agents.* In most kinds of business it is desirable to patronize home industry, and it is commendable to employ artizans, physicians, lawyers or patent solicitors, residing in the same city or village as the person needing his patronage, provided that such fellow-townsmen are known to be fully competent in their respective occupations; and in such case the principle of home patronage is an evidence of good citizenship. In the profession of patent solicitors, however, it is necessary that the applicant for a patent or his attorney shall be conversant with what has been done previously in the line of invention in which he is about to apply for a patent; as without this knowledge the applicant is likely to suffer the mortification of a rejection; or his specification will be so worded as to render his patent useless. We advise inventors to be cautious in placing their inventions in the hands of inexperienced patent solicitors, as our observation has taught us that, among all half-fledged professional men, a bungling patent attorney is the most pernicious, for he is almost certain to injure the inventor.

PATENT CASE.—WOOD-SPLITTING MACHINE.

On the 5th inst., an important case was tried before Judge Ingersoll, in the U. S. District Court, this city, in which the validity of two patents was at issue. J. A. Conover sued J. H. Rapp for damages for infringing his patent for a wood-splitting machine, granted May 10, 1855. The defendant pleaded the general issue, and especially that his machine was different from that of the plaintiff, and that it was also secured by a patent issued to Philip Ruger, Jan. 25, 1859. The validity of the plaintiff's patent having been questioned, it was sustained by the decision, but only six cents damages were awarded. Quite a number of patents have been issued for such machines. The business of splitting pine and other woods, for kindling fires, is now carried on extensively in our large cities; hence the importance of controlling, by patents, the machines which are employed for such purposes.

Flies on Picture Frames.—There is no better preventive of flies soiling gilt frames than by covering them with gauze. It must be admitted, however, that many persons prefer leaving the frames exposed rather than hide them under the usual gauze covering; I would therefore suggest to manufacturers the advantage of improving the material. As at present made, the fabric is woven much closer than is necessary. The finest and most open work gossamer that could be wove would prove effectual in preventing flies settling near any object that was covered with it. A fly's instinct prevents it going near a cobweb. I would say, then, weave your gauze as fine and as much to resemble a spider's web as possible. This would prevent all the evil the housewife dreads, and at the same time would not hide any of the gilt and carved frames.—*S. Piesse.*

Water-wheel Experiments.—The testing operations of model wheels at the Fairmount Water-works, noticed in former numbers of the Scientific American, are still going on, but thus far, we understand, that only five or six turbines have been experimented with. A correspondent informs us that "Stevenson's Jonval has given out the best percentage of power." There are several other wheels now ready for testing, and inventors appear to be well satisfied with the manner in which the operations have been conducted.

Dredging Machine.—Carmichael & Osgood obtained Letters Patent for an improvement in dredging-machines, May 26, 1846. An application has already been filed in the Patent Office for its extension. The case is to be heard on the 9th day of May next, at the Patent Office. Persons opposed to the extension must file their objections twenty days before the day of hearing.

A COLUMN OF INTERESTING VARIETIES.

The Paris correspondent of the London *Morning Herald* says that experiments at Toulon have shown that the French metallic plates for coating the sides of vessels of war have been found to be perfectly shot-proof, though the four-inch iron plates used in England were broken to pieces by the elongated shot now in use. The French plates are made of iron, steel, and some other metal, but what other the correspondent could not ascertain. .....At the time of opening the Cooper Institute, in this city, 1,200 persons had applied for tickets to the several free classes.....The oldest church in America was built in the town of Hingham, Mass., in the year 1781, and is still used as a place of worship. The bell rope hangs down in the middle of the house, where it was placed in order that the bell might be rung instantly to give alarm of any sudden incursion. There are many of the old fashioned square pews in the house, enclosed by what resembles more a high unpainted fence than anything to be seen in a modern church. The frame is of oak, and the beams are huge and numerous. The old house is good for two hundred years more. This old church has an old pastor, the Rev. Joseph Richardson, who has preached in it for 53 years.....A correspondent of the Manchester *Mirror* says that a few days since a needle was taken from the outer and lower side of the foot, near the little toe joint, of Mrs. Ira Atwood, of North Sandwich, N. H., which she swallowed six years since. The needle was a shoe needle, a little over an inch long, and it was whole and quite rusty. The lady was alarmed at the time she swallowed the needle, but she had felt no inconvenience from it, and had forgotten the circumstance until she felt a pricking in her foot, when the needle was discovered.....Three hundred and seventy-three railway trains leave the city of London, England, every Sunday, to carry excursionists various distances into the country.....The Agricultural Bureau of the United States Patent Office have received intelligence of the shipment from Havre, France, of a large swarm of Lombardy bees. These bees will be sent, upon their arrival here, direct to the Agricultural Bureau. They are of larger size than the ordinary bee, and, having a longer bill, are able to suck flowers inaccessible to the American bee. The product of an old hive of these bees is sometimes 150 pounds of honey in one season. These bees will not be disturbed until 1861, by which time it is expected to rear from the swarm now *in transitu* stock enough for six hundred hives.....Numerous facts indicate that the State of New Jersey is settling down beneath the sea at the rate of about a foot in 100 years.....It is ascertained that the fixed stars, as they have been called, are all in motion, but their distances from us are so great that very delicate observations are required to discover these motions.....A man named Daniel Stafford stole a pair of oxen near Detroit last week, and in fourteen hours from the commission of the deed, he had been arrested, tried, convicted, and on his way to the State Prison under a sentence of three years.....There are four Shaker societies in Ohio, numbering 1,059; one in Connecticut, numbering 200; two in Maine, numbering 150; two in New Hampshire, numbering 500; four in Massachusetts, numbering 700; two in Kentucky, numbering 900; three in New York, numbering 1,050; making in all 18 societies.....The world could not get along without North Carolina. Her tar, pitch, and turpentine are used in every corner of the globe. The amount shipped to England during the year 1858 is valued at $2,176,870..... 162 pounds of starch consist of 72 pounds of carbon, 10 pounds of hydrogen, and 80 pounds of oxygen.....A discovery of great importance has just been made by the State geologist, in Texas. It is no less than the discovery of vast bodies of iron ore, as well as tertiary coal, or lignite, beds of limestone, pipe clay, fire rock and hydraulic limestone, in the region of country immediately south of Harrison county.....The Milan correspondent of the *Morning Post* says that a dog of African breed, which belonged to Gen. Espinasse, who fell at Magenta, still lurks about the spot where he shed his blood, and although often taken away, even to some distance, constantly returns.....Before the close of the present year the Grand Trunk Railway will have been completed to Detroit, a distance of 862 miles in a direct line, with branches in addition, making 1,099 miles of complete railway, including the Victoria Bridge—costing upwards of $60,000,000.

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IMPROVED FAN GOVERNOR.

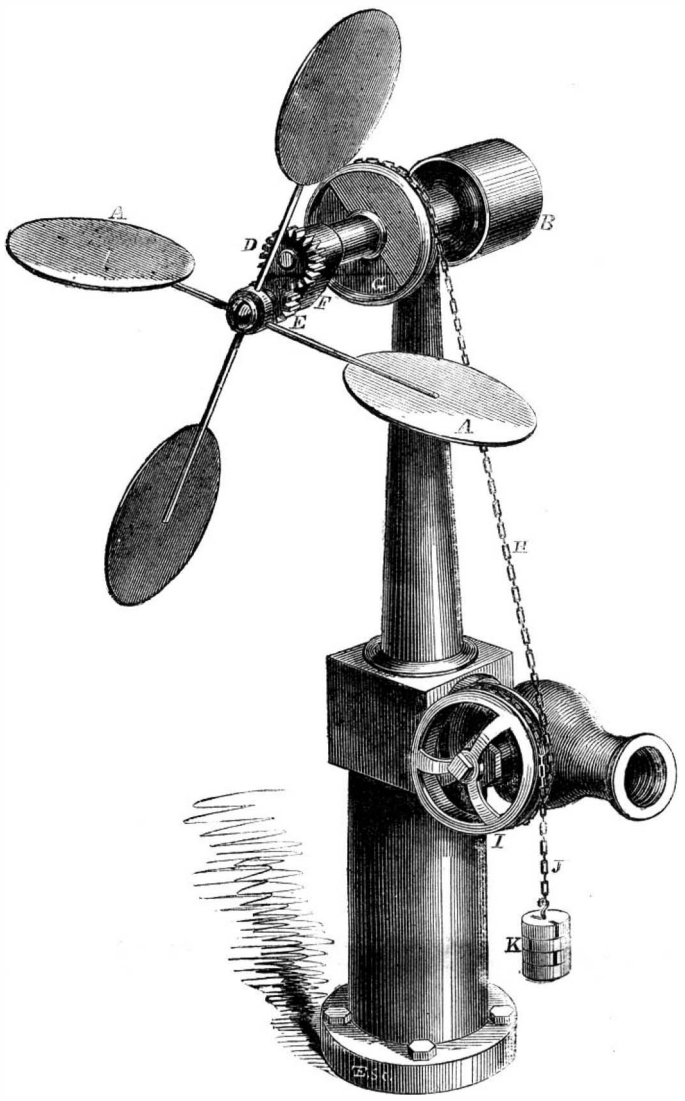
The accompanying engraving represents a form and arrangement of the fan governor for steam-engines which was invented as long ago as 1842, by S. E. Chubbuck, of the late firm of Chubbuck & Campbell, by whom it was applied to nearly all the engines which they made during the last 10 years of their partnership. It is very unusual for us to illustrate an invention in the SCIENTIFIC AMERICAN which has been so long made but, from evidence before us, we have reason to believe this governor a good one, and that, if better known, it will come into more general use. It is based on the principle that the resistance of the air to a revolving fan increases with the increase in the velocity of the revolution.

The power from the engine is applied to the governor by a belt upon the pulley, B, the axle of which pulley passes through the hollow shaft or sleeve, C, and carries upon its end the pinion, D. This pinion, D, gears into the pinion, E, which turns upon an axle firmly secured to the crank, F, of the sleeve, C. The fan, A, is firmly fastened to the pinion, E, and, of course, turns upon the same shaft. It will be seen that, if the fan is prevented from revolving on its own axis, it will be carried by the pinion, D, around *its* axis; and if the freedom of the revolution of the fan is obstructed by the resistance of the air, it will be carried partly around by the pinion, D. It would, indeed, be carrried entirely around this axis, in the case of very slight obstruction to its revolutions, were there nothing to resist its being thus carried around.

The mode in which the variations in the position of the crank, F, are made to open and close the valve, will be readily understood by a brief inspection of the engraving. Upon the sleeve, C, is firmly fastened the wheel, G, which has the chain, H, wrapped partly around its periphery, to which it is secured by a staple; its other end passing down and partly around the wheel, I, to which it is fastened. The wheel, I, is keyed upon the axle of the throttle-valve. Another chain, J, is also fastened by a staple to the wheel, I, and, passing over the upper portion of the wheel, supports a weight, K, at each end. The weight, K, tends to turn the wheel, I, so as to open the valve; while an upward strain upon the chain, H, tends to close the valve. When the speed is properly adjusted, if some of the machinery is thrown out of gear, the increased velocity in the revolutions of the fan, creating greater resistance by the air to these revolutions, causes the crank, F, to be carried further around the pinion, D, thus turning the wheel, G, which, by means of the chain, H, also turns the wheel, I, and partly closes the valve and adapts theflow of the steam to the diminished resistance. If, on the other hand, additional machinery is thrown into gear, a reversed operation takes place, and the valve is opened more widely. By adding to the weight, the opening of the valve and the speed of the machinery is increased; and thus the number of strokes of the engine per minute may be adjusted at pleasure, with the greatest possible facility.

This light and simple governor is manufactured and sold by S. E. Chubbuck & Son, Tremont-street, Roxbury, Mass., to whom all inquiries in relation to it may be addressed.

CHUBBUCK'S FAN GOVERNOR.



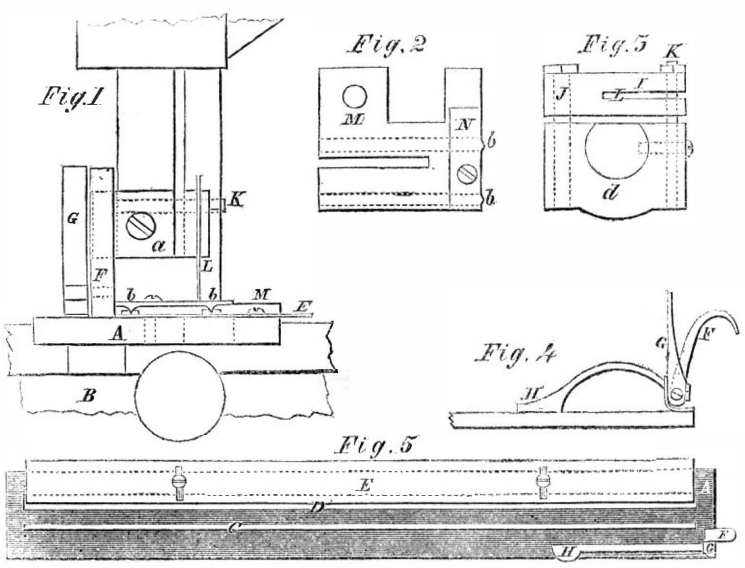
SEWING-MACHINE GUIDE.

The sewing-machine is doubtless destined to receive many improvements before our inventors will consent to call it perfect. In fact scarcely a day passes but from one to three new devices are submitted for our inspection and opinion in this line of invention. The annexed cuts represent a guide and trimming knife, intended principally for boots and shoes, which was patented by John W. Marsh, of Oxford, Mass., Oct. 27, 1859.

It consists of a straight metalic slide, a foot or more in length, to which the cloth or leather is attached, having a long slot through which the needle passes, and a parallel slot for a knife to pass through and trim the work as it moves along. Fig. 1 represents that part of an ordinary sewing-machine at which the work is done, showing also and end view of the slide, of which the other figures represent difierent portions. Fig. 5 is a view ot the slide as seen from above; E, being the plate against which the edge of the cloth is placed, C, the slot for the needle, and, D, the slot for the knife. H, Figs. 4 and 5 is a pad for holding the cloth at one end of the slide which is pressed down by the spring, G; and F, is a handle for drawing the slide back after it has been fed in to the end. Fig. 2 shows the foot piece, M, with its guide, N, and spaces necessary for the needle and knife to work through. It has on its under side two grooves to allow the stitches of the first row to pass on either side of the needle without being flattened while sewing the second; the slide having two points, *b b*, by which to guide the work, in order to make the seams parallel.

The knife, L, is fastened into the needle carrier and and at each motion of the needle passes through the slot, D, and trims the edge of the cloth. In sewing lap seams the knife is removed, and the edge of the lower piece of cloth is brought against the edge of the guide, E, which is set back from the slot, D, a proper distance and thus the cloth is held and the seam made parallel with the edge of the cloth without difficulty. The slide A, has a rack on its under side for the feed wheel when the slide is attached to machines having such feed; it being of course unnecessary in machines using the awl or needle feed.

Persons desiring further information in regard to this invention may address the inventor as above.



MARSH'S SEWING-MACHINE GUIDE.

SOUTHERN CROPS.—The New Orleans *Picayune* has received accounts of the progress of the sugar and cotton crops. In the Lafayette parish of this State the sugar cane is yielding well. Cotton in the same parish opens fast and yields largely. In the parish of Feliciana the picking of cotton is progressing rapidly, and the yield is represented as quite large. In the parish of St. Mary's the sugar yield will be very short, as the seed cane commenced spoiling at an early period of the season. The accounts from upper Tennessee report the cotton plant as small, but quite thickly stocked and early opened. In South Tennessee and North Mississippi the average is better than usual, the yield being full and the quality of the staple tolerably good. Late Texas advices describe heavy rains as having occurred in the western part of the State, which have injured the growing cotton very considerably. The New York *Journal of Commerce* blames the cotton-planters for not being so careful as they were some years ago in cleaning their cotton, and asserts that they are to blame for the great quantity of sand now found in it.

THE ROTTEN FRIGATE.—The steam frigate *Minnesota*, which was found to be rotten, and is now undergoing repairs at the Charlestown navy-yard, is only five years old, and has made but one cruise. All her outside planking, from the water-line to the plank-sheer, is decayed. Many of her knees are also unsound, so that she will have to be almost rebuilt to fit her for service. All the decayed timber is white oak; and some of the yellow pine, with which the oak came in contact, is also rotten. Yellow pine is considered rot-proof, in consequence of the great amount of rosin which it contains; but the presence of the decaying white oak produced eremacansis in the pine in this case, in the same manner that a little leaven promotes fermentation among a large quantity of matter. The live oak in the *Minnesota* has not been the least affected with the rot; it is as fresh as when put in. These are important facts for ship-builders.

OUR THANKS are due, and are hereby tendered to all those friends of the SCIENTIFIC AMERICAN who have responded to the call we made in No. 17 of the present volume, for an increase of our subscription list. Several have responded nobly, and we are truly grateful to them for it. Now that the long winter evenings are approaching—the time for reading and thinking, we feel assured that this journal will supply food to thousands of minds, and we renew our application to its friends to aid in the increase of its circulation. We mean to labor hard to make it a welcome guest at the fireside; and all we ask is, that its readers will give us an appreciative response by sending new subscribers. Who will respond to our call?

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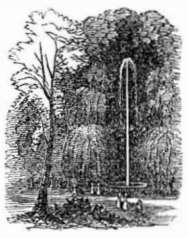
NEW YORK, SATURDAY, NOVEMBER 19, 1859.

CITY PUBLIC PARKS.



A love of natural scenery is inherent to the constitution of man. It is this passion which creates frequent and deep yearnings in the hearts of the denizens in our cities to ramble among the green fields, "far from the strife of tongues and pens." City life is, in many respects, enervating and unnatural. We grow tired of contemplating the stars over the chimney-tops, and of continually beholding living streams of humanity flowing down between rigid banks of brick and mortar in our streets. "Man made the city, but God made the country" is an adage as true as it is forcible; and to combine the rural with the artificial in cities has been considered a most necessary and important arrangement for the health and happiness of the people. The utility of public parks and gardens in cities has been recognized in every civilized country from the earliest times. All the old walled cities contained extensive fields and gardens to which the people resorted for recreation, amusement, and athletic exercises. In all the cities of Europe, there are large public parks, which form huge lungs for the pent-up streets, and invite the toil-worn artisan, as well as the gay and idle, to seek enjoyment within their shady walks. As a means of promoting the public health, they have been considered invaluable, and indispensable; hence we find that, even in such cities as London and Paris, where the population is very dense, many very large public parks and gardens have been laid out. The very same wants have been felt for many years in all our growing cities, and especially in New York with its vast population. Hitherto our public parks have been so small as to excite the derision of foreigners; but our city has at last nobly redeemed itself in this respect by the purchase and arrangement of the "Central Park," which, when completed, will be one of the largest and most beautiful in the world. To convey some idea of its nature and extent we will briefly describe what has been done, and some operations now going on in it.

The Central Park of New York embraces an area of 843 acres, and is two-and-a-half miles long by half a mile wide. The most elevated portion of it is now completed, and is called the "Ramble," a romantic spot interspersed with rocks and dells; and here the genius of man has been skillfully applied to assist nature in developing her charms. From the topmost rock (on which is placed an observatory) the whole city, and its noble bay, with the blue hills of Staten Island in the distance, are spread open to the view of the spectator. Neat walks are laid out among the grey gneiss rocks, and crystal springs send forth their bubbling waters like threads of silver, to wind down the hill sides; while beds of flowers and clumps of shrubbery afford evidence of a master-mind in the whole arrangement.

When completed there will be, within the park boundaries eight-and-a-half miles of carriage-drive, five miles of bridle-road for equestrians, and thirty miles of foot-walks. Several miles of carriage-roads are already opened to the public; four additional miles having been completed and carriages admitted to it on Saturday last The portion along the carriage-way now finished is called the "Mall," the road-way of which is 35 feet wide, and with the side grass-beltings it is 208 feet wide, forming a most splendid promenade. As works of engineering, the roads are unequaled. They are all macadamized, made hard as a rock, and smooth as the celebrated Boulevards of Paris. Three artificial lakes are being laid out, one of which covers 20 acres, and forms the skating-pond. A large extent for fields and lawns are assigned for the evolutions of military companies, games of ball, cricket and other athletic sports. For afternoon carriage-drives, pedestrian exercises and other healthful recreations the Central Park is one of the most beneficial undertakings in which the city of New York has ever engaged, and its benefits will be more fully appreciated years hence than at the present day.

The engineering works now being carried on are worth a visit from India to witness—they are grand and comprehensive. Several bridges are being erected, which, in point of architectural beauty, have not their equal on our continent, and are not surpassed by others anywhere. The most complete system of drainage is carried out, and several miles of rock will have to be blasted to effect this object. The whole grounds are laid out according to the designs of Messrs. Olmstead and Vaux, civil engineers and architects; and no less than 3,000 workmen and 400 horses are engaged in the operations. The scene is full of thrilling interest to visitors. Scattered over the wide extent of ground, the gangs of workmen appear like hives of busy bees; glittering carriages are seen driving along the Mall, and gaily-dressed pedestrians throng the winding foot-walks. Of all the public works undertaken by the city of New York, it appears to give the greatest general satisfaction, by the reasonableness of the contracts, and the integrity with which they are being carried out. The work was commenced in June, 1858, and is expected to be finished in the Fall of 1860. It is not easy to tell what the total cost will be, but it is estimated by some engineers that it will reach $10,000,000. The cost of the work when completed will, of course, depend upon the style and expense of artificial structures yet to be adopted and carried out by the Board. The cost of land purchased for this park, according to the comptroller's report for the present year is $5,406,178 89. Of the $2,000,000, authorized by the acts of 1857-9 for improvements, &c., $1,600,000 has been already expended. On page 33 of the above report will be found the comparative valuation of real estate in the three wards particularly affected by the purchase of land for the park; from this it will be seen that between the years 1855 and 1859, the value has increased to the amount of $7,470,984. In consideration of this and the many other obvious benefits, our wealthy citizens and taxpayers do not seem to grudge the expenditure. It is an enterprise which we advise every city in the country to imitate.

HYATT'S EXTENSION CASE—REMARKS ON THE COMMISSIONER'S DECISION.

We publish in this week's issue the decision rendered by Commissioner Bishop in the case of Hyatt's application for an extension of his patent, and bespeak for it a careful perusal, as it is a document of unusual interest to all who are in any way concerned in patented inventions. The application for the extension was hotly opposed, in fact we may say that we never have had connection with any case where more curious arguments were resorted to, in order to accomplish the defeat of an inventor's claims. At one time it appeared to us that the counsel for the remonstrants, in their zeal to defeat the application, lost sight of argument, and were endeavoring to carry their points by a sort of *brutum fulmen* process. Forgetting the place and the occasion, an attempt was made to impress upon the mind of the Commissioner that Hyatt, the applicant, was what is known in modern politics as a "freedom-shrieker." It was read to the Commissioner from a political journal that Hyatt had actually had an interview with President Pierce upon some Kansas matter, and from all that appeared to the contrary, the President treated him like a gentleman; we wish we could say as much for the counsel. We presume from the emphatic manner in which the Commissioner reasons down the more solid arguments of the remonstrants that no attempt will hereafter be made before him to put an inventor down upon political grounds. The Patent Office, as we understand it, is administered on different principles; and one inventor's claims are to be as righteously adjudicated upon as another's, no matter what opinion he may have of the Administration in power. When the Patent Office becomes a mere machine to punish political offenders, it will then cease to be what it now is—the repository and encourager of the genius of inventors; we believe there will be no two opinions on this subject in the minds of all right-thinking men. The report of the Examiner to whom the case was referred, was of the "jug-handle" order; and although, we doubt not, honestly formed, yet we must believe that if the same spirit should be brought to bear upon all cases presented to the Patent Office, few inventors could feel encouraged to seek its friendly protection. We desire to do no injustice to the Examiner who examined and reported on this case; but we will present a point or two from his report, to show the peculiar reasoning to which he resorted. He attempted to force an analogy between Hyatt's invention and the iron sash used for windows and also the semi-spherical diving-bell, with glasses in its crown, in order to show that Hyatt had invented nothing. Hyatt's invention, on the contrary, is an illuminated load-sustaining grating, whereby subterranean apartments are rendered light, airy and useful for business; it is also a perfect system of protection against burglars and the elements, which cannot be said of the iron window sash, or even of the semi-spherical diving bell. We believe the Patent Office once rejected an application for an improvement on rakes by reference to a *picket fence!* The Examiner also took the position that underground apartments could be and had been well lighted without the use of Hyatt's invention; and that *the general employment of his patent merely proved its superiority over other forms*; and then proceeded to say, with a strange inconsistency, that "even were it clearly established that Mr. Hyatt himself was mainly instrumental in stimulating the increased construction and employment of these basement vaults, this would by no means prove that such construction could justly be credited to the account of his patent vault cover; the growing use of business vaults beneath the pavement in the more busy thoroughfares of great cities is, in fact, the necessary development in the enormous increase in the value of land, and arises solely from this new demand." Yet it was in evidence before the Examiner, and is a fact, that Hyatt had spent the best portion of his life in endeavoring to make property-holders in this city realize the value of basement extensions on his plan, and one half the term of his patent had expired before its value was recognized; and furthermore, in no other of the crowded cities of this country or Europe, except New York, where Mr. Hyatt resides, has his invention been introduced to any extent. It is, therefore, clear that "the increased construction and employment of these basement vaults" is *solely* due to Mr. Hyatt and his invention. We will, however, say no more upon this report, but invite our readers to a careful consideration of the Commissioner's decision. He meets, in a clear and succinct manner, all the points raised by the remonstrants, and completely overwhelms them; and upon the question of what constitutes the proper remuneration for an invention, his remarks are strikingly forcible and unique. The inventors of the country need no other assurance than this, that the successor of Judge Mason and of Mr. Holt is a true friend to their interests.

IRON VESSELS.

There is nothing connected with our industrial interests more worthy of attention at the present time than the development of iron ship-building, which is probably destined to experience a very rapid and gigantic growth; the superiority of iron over wood in every respect except cheapness having been fully settled by thorough trial. It is fortunate that this material did not come into general use before the great improvement in the model of vessels which has been made in the last ten years, as the great durability of iron would have operated run powerfully to retard the change in model. Having commenced the history of iron ship-building in this country, with full descriptions and illustrations of the mode of building iron ships, we intend to continue it by the publication of such facts as will keep our readers informed of the general progress of this great industry. We learn that Samuel Sneeden, of Greenpoint, L. I., has just made a contract with the Flushing Steam Ferry Company to build for them a first-class iron steamboat, 160 feet long, and 27 feet breadth of beam. Mr. Sneeden was the builder of the *Alabama*, which we illustrated on page 242, this volume of the SCIENTIFIC AMERICAN.

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WHAT BECOMES OF HEAT?

A correspondent inquires what becomes, in the winter, of the heat which accumulates in the polar regions during the summer? That great natural force which we call heat, so mysterious in its origin and essence, has been the object of study and observation by many of our clearest intellects, and a vast number of facts in regard to its action have been learned in the last 50 years; and especially in the last 25 years. Dr. Wells' observations of the dew, which were published in 1814, lead the way in the common-sense mode of conducting this series of modern studies of heat; and his very thin volume is well worth reading by any man who takes an interest in the works of nature, and in the correct action of the human intellect, both for the interesting truths which it contains, and as one of the most beautiful and perfect samples of rational investigation. By the means of a few bunches of wool, and some delicate scales and thermometers, Dr. Wells unraveled the cause of the dew, which had, before his time, eluded the comprehension of all who had studied the subject. Since his time the radiation of heat has been investigated by Melloni and others, who have made very numerous and very delicate observations, which resulted in the revelation of many of the laws of its action.

Heat is a restless force; it is constantly rushing, with inconceivable velocity and unmeasurable power, from one body to another—at all events, whenever its equilibrium is disturbed, a circumstance which is constantly occurring in this whirling universe. All substances radiate heat; that is, it is the nature of heat to be constantly rushing out and flying away from any substance in which it exists; and unless the supply is renewed, either by being generated within or by being sent from surrounding bodies, the substance becomes continually more cold. In portions of India where the temperature of the air never falls below 40°, ice is regularly made for sale by simply cutting off water from receiving heat, and allowing it to radiate a portion of that which it contains. Large pits are dug some two feet deep, and filled nearly full of straw, and on this the water is set in broad shallow pans. The straw being a very slow conductor of heat, prevents that which is in the earth from ascending to the pans; and the pans are placed a very little below the surface of the plain to avoid any breeze, and thus prevent a renewal of warm air from continuing the supply of heat to the water. On clear and still nights, these arrangements are found to be perfectly successful, and ice is produced in considerable quantities for market. The water thus placed continues to radiate its heat, as it is always doing; and, being cut off from its usual sources of supply, the temperature soons falls to the freezing point. When there are clouds in the sky, ice does not form; the clouds, radiating heat as well as the water, send down enough to keep the water too warm to freeze. A wind also prevents the formation of ice; the water being supplied with heat by constant contact with fresh bodies of warm air. The pans of water are placed on broad plains, where they may be exposed to a large portion of the sky, and out of view of other masses of matter from which they might receive heat; as heat, like in light, moves straight lines.

Dew is also formed by the radiation of heat to the sky. Heat passes away from bodies which are exposed to space, and if the supply is not maintained, the bodies become enough colder than the air around them to condense the moisture in the air, which appears upon them in little drops of dew. On cloudy nights and on windy nights, no dew is formed, from the same reason that no ice is formed in India under similar circumstances. A board, or even a piece of cloth, suspended horizontally above the ground, by radiating its heat, keeps up the supply to the bodies beneath, and thus prevents them from becoming sufficiently cold to condense the moisture of the air; and this is the reason why no dew is formed in places thus protected. Some surfaces radiate heat much more rapidly than others. Leslie filled a square can with hot water, and, by coating its outside with various substances, he was able to measure with a thermometer the relative heat emitted by each. The following table exhibits the results of his experiments:—

Lampblack	100	India ink	88
Water	100	Ice	85
Rosin	96	Isinglass	85
Sealing-wax	95	Red lead	80
Crown glass	90	Graphite	75
Polished lead	19	Polished iron	15
Polished tin	12	Polished copper	12

From which it seems that lampblack emitted more than eight times as much heat as polished tin, and ice about six-sevenths as much as lampblack.

The heat which comes from the sun upon the polar regions, when they are inclined towards him, is constantly flying away into the boundless depths of space, and as soon as the supply ceases the temperature falls. Some philosophers have speculated upon the probability of the sun, and with it the earth, being gradually cooled till all life shall be extinguished upon our globe, and have attempted to calculate how many millions of years the process will occupy. But, as the solar system is sweeping through space, we know not what sources of heat may lie in its path; neither do we know enough of the generation of heat to render these predictions of any value. As well might the ephemeron, whose existence is limited to a summer's day, infer from his own observations the eternal and unchanging conditions of the earth, as for the human race—which is but an ephemeron in the unlimited flow of time—to conclude from its observations what is to be the eternal condition of matter.

HYATT'S PATENT EXTENSION CASE.

COMMISSIONER BISHOP'S DECISION.

UNITED STATES PATENT OFFICE,
November 4, 1859.

On the application of THADDEUS HYATT, *for the extension of a patent granted to him on the 12th of November*, 1845, *and re-issued on the 3d of April*, 1855, *for "Improvement in Vault Covers":—*

The character and amount of testimony submitted in this case, as well as the acknowledged ability of the counsel employed by both the applicant and the remonstrants, justify the conclusion that the issue involved is one of considerable importance. If no opposition had been made to the extension, and the case rested entirely upon the evidence submitted by the applicant, I should not hesitate to grant the prayer of the petitioner. I shall therefore proceed at once to an examination of the objections to the extension on the part of the remonstrants, with the view of ascertaining whether there is anything therein contained to justify the rejection of this application.

Mr. Hyatt asserts, and has submitted evidence to prove, that he is the first and original inventor of the plan of lighting subterranean apartments by means of the invention set forth in the following claims:—

"What I claim as my invention and desire to secure by Letters Patent in covers for openings to Vaults in floors, decks, &c., is making them of a metallic grating or perforated metallic plate with the apertures *so small* that persons or bodies passing over or falling upon them may be entirely sustained by the metal, substantially as described; but this I only claim when the apertures are protected by glass, as and for the purposes set forth.

"And I also claim, in combination with the grating or perforated cover and glass fitted thereto, the knobs or protuberances on the upper surface of the grating or perforated plate for preventing the abrasion or scratching the glass, substantially as specified."

The applicant further asserts, notwithstanding the greatest exertion upon his part that owing to the neglect and refusal of the public to make use of of his invention when first offered to them, he has failed to obtain a sufficient remuneration for the time, labor, ingenuity and expense bestowed upon it, and its introduction into use.

It is claimed, however, by the remonstrants, that Hyatt is not entitled to a patent for this invention, for the reason that the same thing was patented to J. T. Christy, in England, in 1841, As evidence of this the London *Mechanics' Magazine*, for 1841, is exhibited, in which we find ,under the head of "List of Designs registered between June 28th and July 28th," the following—

"Date of registration—July 6, 1841; No. on the register—742; Registered proprietor's name—J. T. Christy; Subject of design—Coal Plate; Time for which protection is granted—3 years."

From this it appears that J. T. Christy, on the 6th day of July, 1841, registered a design for a coal plate, in the exclusive sale of which he was protected for the term of three years. What this particular coal plate was does not appear from the printed publication. No one in this country would imagine that the words "coal plate" meant an iron frame with several openings filled with thick glass to be placed upon sidewalks or floors for the purpose of admitting light into vaults, cellars, basements, &c. It cannot therefore be claimed that this notice in the *Mechanics' Magazine*, unaccompanied as it is by any explanation of any kind, is a printed description of the particular device for which Letters Patent were granted to Hyatt in 1845.

But the remonstrants have offered in evidence what purports to be a copy of a drawing of an "Improved Coal Plate," registered in England in July, 1841, by John Fell Christy and Company.

I am clearly of the opinion that this drawing and the accompanying affidavits, as well as the affidavit attached to the so-called coal plate, cannot be received as evidence in this case, for the reason that the applicant did not have the opportunity offered him to be present and cross-examine the witnesses, a right which is virtually guaranteed him under the rules of this office. I am aware that it has been urged by remonstrants' counsel that this was the best evidence that could be produced, for the reason that there is no provision under the laws of England for taking certified copies of registered designs. It would require, however, something more than the naked statement of an attorney to satisfy my mind upon that point, particularly in the face of the following remark found in the letter of Newton & Son, patent lawyers, of England, to remonstrants' counsel, marked Exhibit T. "The courts of law are bound to accept as evidence the copies of a design *stamped* with the *Register's seal.*" No such stamp appears upon the drawing purporting to be a copy of Christy's registered design.

But even admitting it to be true that a certified copy of a design registered in England cannot be obtained, does it follow that the affidavit of any private individual can be received in lieu of such certified copy, when the opposing party has had no opportunity of testing by a cross examination the character and veracity of the witness? I apprehend that no Court of law would recognize a principle so manifestly dangerous and unjust. Waiving the objections of applicant's counsel to the admissibility of the testimony of John Stuart, and what do we have to establish the fact that the invention claimed by Hyatt was patented in England in 1841? Stuart testifies that he saw vault covers in use in England made of one piece of cast-iron, with four holes in each, about 3½ or 4 inches in diameter, with pieces of thick glass fitted into each hole, and that said vault covers were similar to one exhibited to him on the stand. There is, however, no *legal or admissible testimony* to show whether the particular vault cover shown to Stuart was made in London, Paris, or New York; whether it was made by Christy, in 1841, or by J. T. Jackson, in 1859. Stuart does not testify that the vault cover which he saw in England was, to his knowledge, ever *patented or even registered.* All that can be inferred from his testimony is that he saw such vault covers *in use or on sale* in England in 1841 or 1842. The point is well settled that the mere prior knowledge and use of an article in a foreign country does not destroy the validity of a patent for the same thing in this country. I deem it, therefore, unnecessary to inquire whether a registered coal plate is, within the meaning of our laws, a patented coal plate, as there is no legal evidence to show what the particular coal plate registered in England was. But if we admit the affidavits, the cast-iron coal plate, and the alleged copy of Christy's drawing, there is, even then, nothing to destroy the validity of Hyatt's patent. All of this evidence proves no more than that Christy's registered *coal plate* was a round iron cover with four round holes in it, while Hyatt's invention, as described in his original specification, is a vault cover so constructed "*as to admit light through a considerable number of small glasses or lenses which are so set in the iron cover as to effectually defend them from injury by the falling or pressure of weighty bodies upon them, or from the contraction or expansion of the metal; they being protected by knobs or protuberances on the iron cover, and defended also by being set in a frame-work of wood or soft metal or wood and soft metal combined, which will yield to percussion, and thus aid effectually in preventing the breaking of the glass.*"

The testimony of Wm. W. Cornell (in which he states that he saw in England, in 1857, "a light marked 'Christy; registered July 6, 1841,' twelve inches in diameter, containing four round glasses, each four inches in diameter,") fails to establish the fact that Christy's coal plate, as registered, contained any glasses at all. I have examined the purported copy of Christy's registered drawing, the *Mechanics' Magazine* for 1841, the cast-iron coal plate, the testimony of Stuart and Wm. W. Cornell, as well as as all the rejected affidavits, and am unable to find anything therein to prove conclusively that the Christy design registered in 1841 was for a cast-iron plate containing holes filled with glass. We have just as much right to suppose that the holes exhibited in the drawing were not to be filled at all, or were to be filled with pieces of wood or iron in such a manner as to be removed for the purpose of ventilation, as to suppose that they were intended to be filled with glass. The rejected affidavit of Richard Follkard shows that the holes in one of Christy's coal plates were filled with disks of iron after the glasses had been broken out. If Mr. Cornell had chanced to have seen that coal plate with the holes so filled with disks of iron, we would be as much bound to believe that the apertures in Christy's registered coal plate were designed by him to be filled with iron as that they were to be filled with glass.

Cast-iron vault covers, with holes through them for admitting light and air into vaults, had been in use in this country long before the invention of Mr. Hyatt. These were of various shapes and designs, and there is no admissible evidence submitted in this case to justify the conclusion that the Christy registered coal plate was anything more than a design for an old-fashioned open vault cover.

Although, under the view I have taken of this point, it is a matter of no importance, still it may not be amiss to state that the coal plate referred to in the *Mechanics' Magazine* is represented as being registered by J. T. Christy; the one referred to in Exhibit A, by John Fell Christy & Company; while the name shown in said exhibit upon the drawing itself is J. E. Christy & Co.

For the reason hereinbefore referred to, I must set aside the Christy coal plate as having no bearing upon

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this case. It is further claimed by the remonstrants that Hyatt's invention is nothing more than a mere duplication of Rockwell's vault cover, patented in 1834.

This invention of Rockwell was for a vault cover composed of a single plate of glass of any size or shape, inclosed by an ornamental rim of iron. Rockwell does not set forth, in his specification or claim, any method for preventing the breaking of his glass by the contraction and expansion of the iron rim, or any plan for fitting in the glass in such a manner as to prevent leakage. The attention of the Office was called to the Rockwell light by Hyatt in his original application, as well as in his application for a re-issue, for he describes therein the leading features of Rockwell's light, and points out the improvements upon it which he has invented. In view of these facts, the Office has twice decided that Hyatt's invention was such an improvement upon the iron vault cover with a single glass as to entitle him to a patent. I should not, therefore, feel justified, at this late day, in overruling the decision of the Office, twice rendered upon that identical point, unless I was satisfied beyond the shadow of a doubt that the Office erred in its former decisions. I am not free from doubts upon that subject, and must therefore regard the action of the Office in granting a patent as entirely correct, at least, so far as the Rockwell vault light is concerned.

We are next led to inquire whether iron window sashes add the thick glasses inserted in the top of diving-bells are to be regarded as anticipations of Hyatt's invention. To answer this it is only necessary to ask whether either of them, placed in a side-walk, would have accomplished all that is realized from Hyatt's invention? Would the former have been safe for people walking over them when the glasses were broken out, or would the latter have made suitable vault covers, combining all the advantages of his invention?

Hyatt may have noticed the metallic window sash and the top of the diving-bell, and these may have suggested to his mind the idea of combining the iron grating of the one, properly modified, with the thick glass of the other, in such a manner as to form his metallic illuminating grating. If no invention was required to accomplish this result, why did not Rockwell think of it when he applied for his patent in 1834? Why did not some other ingenious mechanic, who was aware of the importance of a full supply of light to those subterranean vaults, accomplish the same result? The fact that such vaults had for a long time been in existence, and that no living man had before thought of such a thing as covering the top of such vaults with simple iron covers, with small openings filled with glass, in such a manner as to be water-tight and secure from breaking by persons passing over them, and so constructed that. even if the glasses were all broken out, the covers would still be safe to walk over, makes it perfectly clear to my mind that there must have been some ingenuity and invention exercised by Mr. Hyatt. It may be said that the amount of ingenuity and invention displayed was exceedingly small and insignificant; still it was so great that hundreds of people besides Mr. Hyatt, who had seen metallic window sashes and thick glasses in diving-bells, day after day and year after year, had never thought or dreamed of combining these in such a way as to produce the article which he claims as his invention. It seems, therefore, that Hyatt, at least, displayed more ingenuity in this particular line than any one before him.

Other points have been presented by the remonstrants as showing a want of invention and originality on the part of Mr. Hyatt; but as these are of less importance than those to which I have already alluded, I deem it unnecessary to further pursue the inquiry in regard to the original patentability of his invention, and shall therefore proceed at once to examine the objection made to the re-issue of Hyatt's patent in 1855.

It is urged by the remonstrants that the claims in the re-issued patent confer upon the applicant more than he was entitled to—that it embraces new matter not contemplated by Hyatt when he made his original application.

I regard the plan of forming a metallic grating with several small apertures filled with glass, for the purpose of letting in the light and keeping out the rain, as the gist of his original invention. Hyatt's real invention, however, is better explained by himself, in his original specification, in the following language:—

"I have so contrived my illuminating vault cover as to admit the light through a considerable number of small glasses or lenses, which are so set into the iron cover as effectually to defend them from injury by the falling or pressure of weighty bodies upon them, or from the expansion and contraction of the metal; they being protected by knobs or protuberances on the iron cover, and defended also by being set in a frame-work of wood or of soft metal, or of wood and soft metal combined, which will yield to percussion, and thus aid effectually in preventing the breaking of the glass. In situations where it is desirable, I combine a ventilator with my vault cover in such a manner as to allow a current of air or vapor to pass freely, whilst the entrance of water from without, under ordinary circumstances, is prevented."

He then goes on to describe minutely one or two methods by which he confines the glasses in their proper positions in the vault cover by the use of laminæ of wood, or soft metal, or of both combined.

The question therefore arises, was his invention merely the particular method shown in his drawing of securing the glasses to the metal frame, or was it the general plan of combining a perforated vault cover with small glasses in such a manner as would accomplish the object desired? Most obviously the latter. Mr. Hyatt, in his original application, virtually gave the following analysis of his invention:—

1st. A metallic vault cover, with holes so small that it may be safely walked over.

2d. Small thick glasses, to be placed in the holes in such a manner that light may be admitted, and that they may not be broken by the contraction and expansion of the metal.

3d. Knobs or protuberances upon the upper surface of the metallic vault cover, to protect the glasses from scratching or injury.

4th. Wood or soft metal, into which the glasses are to be so set as to yield to percussion.

5th. The whole to be made water-tight.

The elements of the invention are here set forth in such a clear manner that an ordinary mechanic, skilled in the business to which this invention appertains, could, without any further explanation, have constructed a vault cover which would have answered all the purposes that Hyatt's vault light was intended to accomplish. One mechanic might have secured the glasses to the metallic frame in one way; another mechanic, in a different way. One might have used wood, the other lead; still, the result would have been a load-sustaining, light-admitting, surface-protected, water-proof vault cover; and, however, different the modes of securing and protecting the glasses may have been, they could only be regarded as equivalents of the particular mode which Hyatt exhibited by his drawings. The affidavits of Messrs. Delavan, Stoughton, Aldrich, Brooks, and others, which were submitted at the time of Hyatt's application for re-issue, show conclusively *that, previous to his application for his patent in August*, 1845, he constructed and put down at the Delavan House, in Albany, several vault lights, some of which consisted of a single plate of cast-iron with small apertures, into which apertures the glasses were fitted with cement, and protected from injury by projections upon the upper surface of the cast-iron plate; while small plates of brass, with openings in them corresponding with the size and shape of the glasses, were placed over the top of said glasses, and secured to the cast-iron plate by means of screw-bolts and nuts. These affidavits were not, in my judgment, introduced, on the application for re-issue, for the purpose of showing that Hyatt had, previous to his original application for a patent in 1845, invented more than was described in said original application, so that he might be enabled to embrace in his re-issue new matter not referred to in the original specification. They were evidently designed to show that this invention, *as set forth in the original application*, did not consist of a particular method of securing the glasses to the iron vault cover, but included an iron vault cover with several small glasses, properly protected and so secured as to make a safe, water-tight, illuminating cover. I have no hesitation, therefore, in saying that the re-issued patent of April 3, 1855, confers upon Hyatt nothing more than he was entitled to claim under his original application, and nothing more than he described in said original application.

I must accordingly hold that the invention secured by the patent of 1845, and by the re-issue of 1855, and for which an extension is now asked, was new and patentable when patented. It is, however, claimed by the remonstrants that the applicant has sold and put down illuminated vault covers or gratings marked "T. Hyatt, patented Nov. 12, 1845," which were not covered by his patent, and has thus abused the privilege secured to him by his patent, as well as virtually threatened to prosecute persons for using that which they had a perfect right to use. I do not consider it my province to inquire into this point. The patent law provides for the imposition of heavy fines upon all persons who sell articles marked as patented, which are not patented. And, for all that appears to the contrary, Mr. Hyatt may yet be obliged to pay these very penalties. Should his application for extension be refused on this ground, he might be punished twice for the same offense, once by the Patent Office and again by the courts. The only points into which the Commissioner is authorized by law to inquire, on an application for extension, are—

Was the invention new and patentable when patented?

Is it a useful and important one to the public?

Has the inventor used due diligence in introducing his into general use?

Has he received a reasonable remuneration for the time, ingenuity and expense bestowed upon the same and the introduction thereof into use?

There is no pretence in this case that Mr. Hyatt has not endeavored, steadily and persistently, to induce the public to use his invention. The testimony clearly proves that his attention was directed to the subject of vault lights as early as 1834, when he was a student-at-law; that from that time until the present, he has been engaged upon this subject. Indeed, I doubt whether many instances can be found where an inventor has devoted more time and effort to his invention and its introduction into use. The testimony of several architects of acknowledged reputation and skill, as well as the testimony of real estate proprietors who have used his illuminating vault covers, fully establishes the fact that Mr. Hyatt's invention is an exceedingly valuable one to the public; it is mainly through his untiring efforts that landowners have been induced to adopt his lights, and extend the basements of their buildings under the side-walks, and thus add to the value and convenience of their property.

It is through his efforts that the former dark, damp and gloomy subterranean vaults, fit only for the storage of coal, wood or boxes, have been transformed into cheerful and useful apartments, suitable for the transaction of business. And, although it appears that the New York *Sun* Building was constructed with a basement extension, and lighted by Rockwell's vault lights, before the patent of Hyatt was granted, still, it seems that no person, with the example before him, considered it of sufficient importance to warrant its repetition. Property-holders continued to build their stores and warehouses in the old-fashioned way; and it was not until after Hyatt had succeeded in having his ideas carried out at Cooley's Building, on the corner of Broadway and Cortlandt-street, and at the *Herald* Building, in the city of New York, that the public were convinced of the value and importance of his invention. It was then discovered that there was remaining unoccupied, under the streets and sidewalks of New York, and of other large cities, a vast amount of space which might, by the adoption of Hyatt's lights, be rendered as valuable as the second floors of buildings; while the additional rent to be realized therefrom would pay the interest upon the additional cost, and still leave a large per centage for the benefit of the owners of the property.

It is unnecessary to consider whether the invention of Hyatt has been the means of enhancing the value of real estate in large cities, or whether the enhanced value of real estate has made the use of his invention a matter of great importance, or even necessity. In either event, the value of the invention must be admitted. Its value and importance is further established by the fact, that land-holders prefer to use his invention, and pay him a large royalty for such use, rather than use the invention of Rockwell, or iron sashes with large openings filled with thick glass, both of which belong to the public.

I am entirely satisfied that Hyatt's invention, whether it was the result of a high degree of inventive genius or required but a very small amount of ingenuity, is a very valuable one to the public, and has proved a source of more advantage and profit to them than to the inventor himself.

I shall therefore, without further remark, pass to the consideration of the question, "Has the inventor received a reasonable remuneration for the time, ingenuity and expense bestowed upon his invention and the introduction thereof into use?"

The profit which Hyatt will realize from his invention, by the day on which his patent expires, will, as near as I can calculate, amount to about $93,000. In deciding the point of sufficiency of compensation, various preliminary points are first to be determined.

It was undoubtedly the intention of Congress, in establishing our patent system, to offer a premium for the fruits of inventive genius, for the purpose of encouraging progress in the arts of civilized life.

To effect this, it is necessary and proper that an inventor should enjoy the fruit of his labors for a sufficient length of time to enable him to realize more than he would be likely to realize during the same time if engaged in the ordinary branches of business. For unless a man after devoting his time and talent to a new and useful improvement is allowed to make more from his invention than a man of the same capacity and energy can make in other kinds of business; no reward is granted him, and no encouragement extended to others by which they may be induced to follow his example. The law goes upon the presumption that the monopoly by an inventor of his invention, for the period of fourteen years, will as a general thing enable him to reap the proper reward, but, in the event that should not be the case, wisely provides for an extension of the time for the further period of seven years. The amount of this reward should depend to a considerable extent upon the value that the invention is to the public. If the amount paid by the public for a particular improvement which they consider necessary for them to use is greater than the benefit derived from it, they have just right to complain and to protest against the extension of a patent therefor. But if, on the other hand, the benefit which the public has received far outweighs the profits which the inventor has realized, such complaints and protests might be regarded as unjust and unreasonable.

Again: the law presumes that when a new useful and valuable improvement is invented and offered to the public, the public will at once avail itself of the advantages of such an improvement, and that the inventor will at once begin to realize a profit upon his invention, which profit will continue for the period of fourteen years, provided he charges for his improvement *less* than it is really worth.

How are the facts in case?

Many of the first and most reliable men in the city of New York, who have used and paid for this invention, testify that the price paid bears no comparison to the advantages resulting from it. The testimony also proves that the applicant, owing to the persistent neglect or refusal on the part of the public to use his improvement, has really enjoyed his invention but seven or eight years. Thus, if the extension prayed for is granted, he will in fact be secured the advantages of a profitable invention for no longer a period than the law contemplated when his patent was granted.

It is comparatively rare that an invention is made which proves to be of any substantial advantage to the public. When such a thing does occur, the inventor

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is allowed a large and munificent reward, not only on account of the benefits which he may have conferred upon his race, but that his brilliant success may stimulate other inventors to renewed and increased exertion. Rather than with a begrudging spirit grumble at the success of such an inventor, and fear that he may profit too much, we should congratulate ourselves that a wise provision of the law has placed it in our power to bestow a reward upon him commensurate with the benefits which he has conferred upon the public. It is a peculiar feature of this case that the opposition to the extension does not come from those persons who have adopted and paid for the improvement, but from certain rival iron manufacturers and contractors, who, during the fourteen years of the existence of this patent, have probably accumulated larger fortunes from their regular business than Mr. Hyatt has from his invention. The fate of the inventor is a hard one at best. No matter how valuable and important his invention may be, he must first overcome the prejudices of the public, before he is able to obtain any remuneration. By this time, as a general thing, the duration of his patent has already partially expired. Then, as soon as he has succeeded by his labors and perseverence in satisfying the public of the advantages of his invention, and has created a market, hundreds of greedy rivals at once by a system of piracy attempt to rob him of his property. Rich and powerful combinations are formed against him. He is compelled to abandon his invention or submit to prolonged vexations and expensive litigation. Nine inventors out of ten, unable to withstand the pressure brought against them, retire broken-hearted from the contest and finish their lives in povery and want, while those who have robbed them reap all the profit. The applicant in this case is, to a certain extent, a living example of the truth of these statements. It was about seven years after the patent was granted before he succeeded in conquering the prejudices of the public, and rendering his invention profitable; and although he has not as yet been prevented by infringers from realizing some renumeration, still he now finds them remonstrating against the further extension of his patent.

After having devoted more than fourteen years of the best portion of his life to this invention, he has succeeded in realizing a profit of $93,000. This covers his profit both as inventor and manufacturer, as well as all that may be properly chargeable to his other patents. A thorough investigation of the case has satisfied my mind that the profit which the applicant has received from his invention is not sufficient, when compared with the advantages which the public have experienced from it.

It is therefore ordered that the patent be extended for seven years from the 12th day of November, 1859.

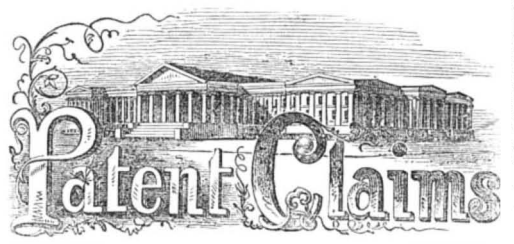
W. D. BISHOP,
Commissioner.

FOREIGN SUMMARY.

At the recent meeting of the British Association of Social Science, Lord Brougham, at the advanced age of 82 years, delivered an address over two hours long with all the vigor and eloquence of a young orator. At this meeting many gratifying facts were reported by Mr. A. Baker, regarding the benefits conferred by the Factory Act upon the operatives in English factories. He stated that by the reduction of the hours of labor, there had been a marked and decisive improvement in the health of factory operatives, and an entire disappearance of the physical deformity and excessive mortality which prevailed among those classes previously. In the condition now brought about by that act there was no greater amount of disease, deformity, or mortality among factory laborers than others, while for some years previous to 1832, a marked and alarming deterioration of physical strength had occurred.

The Queen had attended the opening of the new waterworks for the city of Glasgow, at Loch Katrine, in Scotland, made famous in classic song as being the scene of Sir Walter Scott's "Lady of the Lake." It is a beautiful sheet of water, very deep and clear, and is conveyed about the same distance through a conduit as the Croton water at New York. Heretofore, the city of Glasgow has been supplied with water pumped from the river by huge steam-engines; it is now to be supplied by gravitation, and the expense will be much less. As a work of engineering it can compare favorably with some of the greatest achievements of ancient or modern times, and deserves to be very generally known. It embraces 13 miles of tunneling, 9¼ miles of aqueduct, and 3¾ miles of huge iron tubing. There are altogether 70 distinct tunnels, upon which 44 vertical shafts had to be sunk for facilitating the work. The first tunnel is 2,325 yards long, and 600 feet below the summit of the mountain. It was excavated from twelve shafts, which had to be sunk 500 feet deep. There is another tunnel 3,650 yards long, cut through blue basalt, at 250 feet below the summit of a hill. The rock in all the tunnels is very hard, being mostly gneiss interspersed with veins of quartz. In some places it required a new drill for every inch that was bored, and although the work was carried on night and day in some shafts, they sometimes could not make over three yards of progress in a month. The undertaking was commenced three years ago, and was recommended by Stephenson and Brunel. It is remarkable that the *Great Eastern*, the Victoria Bridge, and the Glasgow Water Works, with which the names of these great engineers are associated should have been completed just about the time they departed, and that they were denied the pleasure of seeing their designs perfectly finished. The supply of water to Glasgow will be 50,000,000 gallons per day, with a store sufficient for 120 days without rain.

The metal market has been somewhat depressed since our last. This is attributed to the unsettled state of political affairs. Banco tin has fallen slightly, but copper has somewhat advanced. The export of British coal has increased during the past year to the extent of 270,000 tuns, the whole being 4,499,956.



ISSUED FROM THE UNITED STATES PATENT OFFICE

FOR THE WEEK ENDING NOVEMBER 8, 1859.

[Reported Officially for the SCIENTIFIC AMERICAN.]

*** Pamphlets giving full particulars of the mode of applying for patents, size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

26,005.—Corintha Alden, of Cassadaga, N. Y., for an Improved Clothes' Ironing Apparatus:

I claim the arrangement of the box, A, with the follower, B, or its equivalent, in combination with the tank, D, substantially as and for the purpose specified.

[With this invention the operation of ironing is rendered so easy that it requires no bodily exertion, and in fact neither particular attention nor great skill, The clothes are neatly folded in a box, and compressed by means of a follower, and in this state they are exposed to the influence of steam for a few hours. When properly folded they become perfectly smooth.]

26,006.—Ephraim C. Allen, of Le Roy, N. Y., for an Improvement in Corn-planters:

I claim the arrangement of the various parts of the seeding machine described, when the whole are constructed and combined for operation conjointly, as an . for the purposes in this specification set forth.

26,007.—John Aspinall, of London, England, for an Improvement in Refining Sugar. Patented in England Feb. 8, 1859:

I claim the method described of effecting the blowing-up or melting of raw sugars; that is to say, by so supporting or upholding the sugar that successive portions will be brought into contact with the water, whereby the sugar will be melted at or near the surface, for the purposes and substantially in the manner set forth.

26,008.—Merrick Bemis, of Ashburnham, Mass., for an Improved Compensating Pendulum:

What I claim is my improved mode of making a compensating pendulum, namely, by arranging a part of the rod in the form of a bow or sectoral bend, and applying to such bend or part a clasp or bow of metal having a different expansive ratio, the whole being substantially as specified.

26,009.—Robert Blair, of Malugin Grove, Ill., for an Improved Device for Applying Steam as a Motor:

I claim the combination with a radial lever, or frame, D, and circular railway, A, and central revolving power-transmitting shaft, C, of a traction steam-engine, B, when the crank axes of said engine radiate from the central shaft, C, and the inner traction wheels are made of smaller diameter than the outer one, the whole arranged and operated substantially in the manner and for the purpose set forth.

[The object of this invention is to supersede the various horse-powers that are now used for driving portable machinery, chiefly such as are used by agriculturists, as threshing machines, for instance, churns, pumps, and the like. The invention consists in placing a traction engine on annular ways, and having said engine attached to a radius frame, the center shaft of which is provided with a toothed wheel or pulley, from which the power is taken as the engine passes around the annular ways.]

26,010.—Nelson Burr, of Batavia, Ill., for an Improvement in Corn-shellers:

I claim the peculiar arrangement of the section, e, provided with the ring, j, and placed relatively with the cylinder, A, and adjoining sections, d f, to effect the object set forth, substantially as described.

[This invention consists in the employment or use of a rotating cylinder and a stationary shell, the latter being provided with a door and wing, and the whole so arranged that a very simple and efficient combined corn-sheller and cob-grinding mill is obtained, the machine being capable of being used in either capacity by a very simple adjustment.]

26,011.—Thos. Carpenter, of Battle Creek, Mich., for an Improved Shoemaking Table:

I claim the movable bottom, D, arranged in combination with the bench, A, and compartment box, B, constructed as described, substantially in the manner and for the purpose specified.

26,012.—R. Carkhuff and B. Chalfant, of Lewisburgh, Pa., for an Improvement in Steam Valves:

We claim the peculiar arrangement of the slide, T, and transverse bar, t, which form the valve of the steam chest, K, the bar, U, and the cross-arm, r, of rod, S, whereby said valve is allowed a lateral as well as a longitudinal movement within the chest, for the purpose set forth.

26,013.—L. C. Chase, of Boston, Mass., for an Improvement in Girth Buckles:

I claim constructing a buckle with wings, B B, or their equivalents, and furnished with holes, b b, substantially as set forth and for the objects specified.

26,014.—B. S. Church, of Manhattanville, N. Y., for an Improvement in Water-meters:

I claim, first, The arrangement of the partitions, g g', in the trough G, as described, in combination with the air-tight chamber, D, chamber, F, and tubes, l, whereby that portion of the water which does not pass through the measuring buckets is prevented carrying off any of the air in the chamber, D.

Second, Arranging in the air-chamber, D, a float, j, in combination with a valve, h, or its equivalent, substantially as and for the purpose described.

26,015.—George Clay, of New York City, for an Improvement in Packing for Sliding Gas-lights:

I claim the combination with the pipe, D, shell, A, and pipe, B, of the elastic tube, C, when the latter is fitted so that its central portion will contract and press upon the burner or upon the sliding pipe, so as to form a gas-tight joint, all as shown and described.

[This packing is so simple in its application and so efficient in its action, that it recommends itself to all gas-fitters. It consists simply of an elastic tube, the ends of which are expanded over two nipples, whereby its central part collapses, thereby making a tight fit on the sides of a pipe which passes through said elastic tube, and at the same time allowing the pipe to slide up and down.]

26,016.—J. W. Cochran, of New York City, for an Improvement in Projectiles for Rifled Ordnance:

I claim, first, The band, C, of copper or other wire, applied substantially as described, in combination with the cup, or cup-like frame, B, attached to the rear of the projectile, for the purpose described.

Second, The expanding ring, D, applied substantially as described, in combination with a conical surface, f, formed behind a shoulder on the front part of the projectile, for the purpose set forth.

26,017.—J. W. Cochran, of New York City, for an Improvement in Projectiles for Rifled Ordnance:

I claim the application to a projectile for rifled ordnance of a covering, or of one or more bands, composed of a coil or coils of copper or other wire, wound upon its exterior, substantially as described for the purpose specified.

26,018.—D. W. Comstock, of Chicago, Ill., for an Improved Railroad Gate:

I claim placing the ends of two pairs of adjoining rails, B', on a rising and falling platform, C, when the latter is suspended from the short arms, d, of crank levers, d e, the long arms, e, of which carry the panels, F, of a gate, substantially in the manner and for the purpose described.

[This invention is of great importance, particularly in such places where railroads pass through towns, or wherever a railroad crosses a common road. The gate opens as the train approaches, and as soon as the last car has passed it closes again, so that nothing can pass into the road which might cause an obstruction to the approaching train.]

26,019.—Wm. F. Converse, of Harrison, Ohio, for an Improvement in Railroad Car Springs:

I claim, first, The combination of a clamp, f g h, with a disk spring, in the manner and for the purpose explained.

Second, In connection with the above, I claim the series of annular steel disks, of unequal diameter, arranged in manner and for the purpose described.

26,020.—N. B. Cooper, of Gratis, Ohio, for an Improved Churn-dasher:

I claim the arrangement of the arms, d d, on the two points, b' b', one on each side of the upright, B, when the upright, B, is made removable by means of the ways, x x, substantially as set forth.

26,021.—Edward Crane, of Dorchester, Mass., for an Improved Steam Boiler:

I claim a fire-box surrounded by a water-jacket, the combination of the tubes in the fire-box, with the boxes or chambers, as described, so that a number of tubes shall have the same connections through the said boxes or chambers with the water-jacket and steam chamber, and shall also be capable of being put in and taken out of the boiler at the same time.

I claim the use of tubes coiled or folded into the fire-box, and connected with the water-jacket and steam chamber through the boxes or chambers, a and b, and a'' and b,'' as described, of such length in proportion to their diameter that all the water entering them at the lower end as shall be converted into steam in the lower portion, and the steam be superheated in the upper portion before it is discharged into the steam chamber.

I claim the use of tubes in the steam chamber for discharging the steam generated in the tubes in the fire-box, so bent that the superheated steam issuing therefrom shall be discharged into a drum around the chimney and against the chimney, in the first instance, and then against the surface of the water, as described.

I also claim the use of the drum around the chimney in the steam chamber for securing the discharge from the tubes, and checking the disturbance of the water through the whole extent of the steam chamber, arranged and constructed as described.

I claim the combination of the blow-off cocks, e, with the stop cocks g, for the purpose of blowing off each section of tubes separately, as described.

I claim the use of the tube coiled around the chimney, for the purpose of taking the steam from the steam chamber, at the point where it has the highest temperature.

26,022.—Edward Crane, of Dorchester, Mass., for an Improvement in Railroad Car Wheels:

I claim a wheel having its rim and tire secured together by india-rubber vulcanized in place, as set forth.

26,023.—Munson C. Cronk, of Auburn, N Y., for an Improved Clothes' Dryer:

I claim the combination and arrangement of the hollow post, A, the sliding piece, R, brace cords, M N O P Q, the hub, B, the stands, W X Y Z, and the radial arms, C D E F G, the ring, V, substantially in the manner and for the purpose specified.

26,024.—C. A. Desobry, of Plaquemine, La., for an Improvement in Pans for Evaporating Cane Juice:

I claim the heaters, B B, of inverted cup form, applied within the pan, in combination with the system of connections, E E F F, and the two series of pipes, S S and W W below the pan, substantially as described,

And in combination with the said heaters, connections, and two systems of pipes, I claim the pipes, b b, passing through the said heaters, substantially as described.

[This invention consists in a certain novel system of heaters arranged within an evaporating pan, in combination with a suitable system of connections with two series of pipes arranged below the pan for supplying steam to the said heaters and conveying away the water of condensation, whereby I am enabled to present an extensive and very effective heating surface to the liquid or substance within the pan, and to prevent effectively any collection of water upon the said surfaces.]

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26,025.—Jacob Edson, of Boston, Mass., for an Improvement in Pumps:

I claim the peculiar manner in which I support the cylinder upon the flanges, L, in combination with the vacuum chamber, H, for the purpose of insuring an unobstructed passage between the said chamber and the induction pipe below the valves, in the manner and for the purpose substantially as set forth.

Second, I claim the manner described of securing the induction pipe to the pump by means of the projecting bearing points, m, operating in the manner substantially as set forth.

Third, I claim the described combination and arrangement of the division plate, K, and the cylinder, I, whereby the body of the pump is divided into two distinct chambers, the one serving as an air or water chamber, and the other as a vacuum chamber, as set forth.

26,026.—Thaddeus Fairbanks, of St. Johnsbury, Vt., for an Improvement in Letter-scales:

I claim my improved manufacture of letter-scale as made, not only with its pendulous weight, K, connected with the scale pan, F, by a forked arm, H H′, provided with bearings, h i, for receiving and resting on knife edges of a bar, I, extended from the steel yard, as specified, but with a bar steel yard, E, made without any fork, and extended into a stationary staple or stop, g; the whole being arranged in manner and to operate as specified.

26,027.—John M. Forrest, of Norfolk, Va., for an Improved Sash-fastener:

I claim the springs, C and C′, and the ratchets, G and G′, as constructed in combination with the levers, D, and cord, F, operating as described, and for the purposes set forth.

26,028.—Leonard D. Gale, of Washington, D. C., for an Improvement in the Manufacture of Gas:

I claim the treatment of bitumen, bituminous coal and their distillates, or their equivalent, by first converting the volatile portions to a state of vapor, at a temperature below a cherry red heat, and then forcing the vapor so generated into contact with a red-hot surface in such a manner that the gas generated may be instantaneously removed from the said heated surface, and thus be prevented from further decomposition.

26,029.—Thaddeus A. Granger, of Wilson county, N. C., for an Improvement in Machines for Hoisting Mare, &c.:

I claim the construction of the cap timber, C, in combination with the supporting timber, D, which forms the swivel, to allow the beam, D, to be moved to any point desired.

26,030.—Leonard D. Gale, of Washington, D. C., for an Improvement in the Manufacture of Gas:

I claim the treatment of all woody, resinous and fatty bodies, as well as all tarry matter, except bitumen, bituminous coal and other distillates, by first converting the volatile portions to vapor at a temperature below a cherry red heat, and afterward forcing the vapor so generated into contact with a red-hot surface in such a manner that the gas generated thereby may be instantly removed from said heated surface, and thus be prevented from further decomposition.

26,031.—Noah E. Hale, of Nashua, N. H., for an Improvement in Applying Pressure to Top Rolls of Drawing Machinery:

I claim the arrangement and combination of the drawing rolls, C′ D′, straps, H, attached at the ends of said rolls, adjustable bars, G, lever, J, weight, K, rod, N, bell crank lever, L, and hanger, O, as and for the purpose shown and described.

26,032.—E. H. Harris, of Palmetto, Ga., for an Improvement in Carriage-seats:

I claim attaching the seat, B, to the body, A, of the vehicle by means of the bars, a, and rods, c, or their equivalents, so as to permit of a certain degree of play of the seats, or movement thereof, independent of the body, A, for the purpose specified.

[The object of this invention is to attach the seat of a vehicle to its body in such a manner as to allow the seat a certain degree of play or movement independent of the body, so that, in case the vehicle is suddenly stopped or started, the seat will yield or give and prevent the occupants from being thrown therefrom.]

26,033.—J. P. Harris, of Byhalia, Miss., for an Improvement in Plows:

I claim the combination of the separately adjustable and removable mold-board, E, with a subsoil share, C, situated behind and below it; the said subsoil share being also separately removable, to allow the separate use of said mold board, substantially as specified.

26,034.—Horatio F. Hicks, of Grand View, Ind., for an Improvement in Machines for Pulling and Cutting Cotton and Corn-stalks:

I claim the combination of the reel, D, paddle, H, drum, G, and cutter, I, operating substantially as and for the purpose set forth.

26,035.—Wm. Cleveland Hicks, of Boston, Mass., for an Improvement in Sewing-machines:

I claim, as my method of controlling needle thread in sewing-machines, by a combination of mechanism substantially as described, by which a bar or wire, through which the thread passes, and by which the thread is tightened and loosened, shall have the described motion combined, firstly, to be drawn up by the needle bar, or its equivalent, during its entire upward motion; secondly, held at rest until the needle eye is at or near the material to be sewed; and thirdly, to be disengaged and allowed or caused to fall by its own gravity, or by the assistance of a spring, for the purpose of gaining the amount of motion lost by remaining at rest during the first part of the downward motion of the needle bar, all substantially as described and specified.

26,036.—N. E. Hinds, of Cooperstown, N. Y., for an Improved Horse-shoe:

I claim, first, The wider and thicker enlargement of the toe or fore part of the shoe.

Second, I claim the trough-like concave form of the underside of the shoe and the raised edges, B B and C, that ensue, as a consequence of the construction of said concave form.

Third, I claim the construction of calks made in a V, or double V-form, all of which is constructed and claimed substantially as and for the purposes set forth and specified.

26,037.—A. D. Hoffman, of Belleville, Mich., for an Improvement in Cider Mills:

I claim the combination of the crushing rollers, B B′, pressure rollers, E F, and endless apron, G, when the crushing rollers, B B′, are provided respectively with teeth, a, and recesses, b, and the pressure roller, E, provided with the yielding bars, c, and canvass covering, g, substantially as and for the purpose set forth.

[The object of this invention is to obtain, within limited dimensions, a machine that will crush apples and express the juice therefrom with but a small expenditure of power; the crushing and expressing operations being performed simultaneously and the juice separated from the pumice. The invention consists in the employment or use of two crushing rollers, one being toothed and the other correspondently recessed to receive the teeth of the former one, and using, in connection with the crushing rollers, two pressure rollers and an endless apron; one pressure roller being provided with yielding longitudinal bars, and the whole arranged and combined to operate in such a manner as to effect the desired result.]

26,038.—S. F. Lewis, of San Francisco, Cal., for an Improvement in Pulley Blocks:

I claim, first, The arrangement and combination of the pulleys, C, shoe, D, and eccentric, E, within the block, A, as and for the purpose specified.

Second, The teeth or projections, b, and stop, c, formed respectively on the pulley, C, and shoe, D, to operate as and for the purpose set forth.

[This invention consists in the employment or use of an eccentric and shoe placed within the block, and so arranged relatively with the pulley that said parts, when used in connection with stops on the pulley and a stop on the shoe, enable the attendant to control the movement of the rope, checking or stopping it entirely when the article to be elevated is at the proper hight and the power is to be detached, and regulating the descent of the article as may be required. The invention is applicable to all purposes where stop-blocks are used, but is more especially designed for discharging cargoes from vessels and similar purposes where a horse or other animal is employed for elevating the articles.]

26,039.—James P. McLean, of New York City for an Improvement in Abdominal Corsets:

I claim a corset or belt with cork brackets or projections, B BB′, on its zone, the upper or top edge of such brackets being beveled, as shown in the drawings, in combination with the abdominal pads, A1 A1 A2 A2, which form a part of the lower section of the corset or bandage, and are held in their places by the same, in the manner and for the purpose set forth in the drawings.

26,040.—James McNamee, of Easton, Pa., for an Improved Knife-cleaner:

I claim the upper socket, D, with its pad, I, operated by the socket, F, with its pad, and the reservoir, B, when the pad of the lower socket is rendered adjustable, in respect to the reservoir, and when the several parts are arranged in respect to each other, as and for the purpose set forth.

26,041.—Allen N. Merrill, of Batavia, Ill., for an Improvement in Seeding-machines:

I claim, first, The employment or use of a longitudinal adjustable shaft, H, provided with cylinders, J, having different sized seed cells in connection with perforated bars, g, slides, i, and plate, k, arranged to operate substantially as and for the purpose set forth.

Second, The arrangement and combination of the spout, l, conductors, K, shoe spouts, L, and elevating arms, E, on shaft, D, connected to the conductors, K, the whole being arranged substantially as and for the purpose set forth.

[This invention consists in a peculiar arrangement and combination of parts, whereby different kinds of seed may be planted with one and the same machine, and at different distances apart, as may be required.]

26,042.—John H. Miller and Samuel Albright, of Grafton, Va., for an Improvement in Portable Gas Apparatus:

We claim a portable gasometer, C, furnished with a central gas discharge pipe, E, a central guide rod, S, a flexible connecting pipe, F, and one or more ratchet bars, H H, and arranged in a frame, A A B B, which is provided with one or more spring pawls, I I, for use in a railroad car, or other traveling apparatus, which is subject to a jolting or vibrating motion, for the purpose of supplying gas to a series of gas-burners, substantially as and for the purposes set forth.

26,043.—Charles Minzheimer, of New York City, for an Improvement in Skirts:

I claim the expanding joint, D D, and strings, E E, or their equivalents, at the back of the skirt, in combination with the openings, m m, in the other, substantially as and for the purposes specified.

26,044.—Oliver P. Moran, of Haynesville, Mo., for an Improvement in Corn-planters:

I claim the combination of the curved concentric aperture, o, in the bottom of the seed-box, G, with the sliding strike, N, and measuring holes, m m, for the purpose of charging said holes from the seed-box with the least possible weight upon and impediment to the motion of the dropping wheel, D, as specified.

I also claim the combination of the concentric vibratory arm, h, and projecting pin, l, thereon, with the measuring holes, m m, substantially as specified, for the purpose of imparting the proper movement to the dropping wheel, D.

I also claim the arrangement of the instant valve, M, upon the curved weighted hinge, t, which is pivoted to the sides of the chamber, G, in a position nearly vertically over the valve, in combination with the slotted connecting-rod, S, for the purpose of producing a superior quickness and delicacy of action on the valve, substantially as specified.

26,045.—Austin W. Moses and Joseph A. Springer, of Philadelphia, Pa., for an Improvement in Casting Car Wheels:

We claim the described method of casting railroad car wheels by pouring the central portion of the wheel, independently and in advance of the tread, to allow said central portion to cool and contract to any desired degree before adding the metal forming the tread of the wheel; when said end is accomplished by the employment of a ring, composed of any convenient number of segments, F F, or their equivalents, and arranged to operate in combination with the annular part, D, of the flask, substantially in the manner and for the purpose specified.

26,046.—Jacob H. Mumma, of Harrisburgh, Pa., for an Improvement in Straw-cutters:

I claim, first, The employment of a hawk-bill cutter, a a, constructed and arranged as described, in connection with a cutter bar, c, of a straw-cutter, operating in the manner as and for the purposes set forth.

Second, I claim the slat bed, h, for the purposes of not only cleaning the material from dirt, but also as a feed to the rollers, substantially in the manner and for the purposes set forth.

Third, I claim the employment of the rib, d″, feed-rollers for crushing and dividing the sheet of material to be cut, when arranged and combined with a hawk-bill cutter, a a, and bar, c, substantially in the manner set forth.

26,047.—Adrian V. B. Orr, of Lancaster, Pa., for an Improvement in Sawing-machines:

I claim the oscillating lever, D B, in combination with the spring, T, and feed-lever, l l, when constructed as described, and operating either a single saw or a pair of saws, as specified.

26,048.—George R. Osbrey, of Providence, R. I., for an Improved Heating Apparatus:

I claim the combination of the alcohol reservoir and vaporizer with a lamp for heating the same, when such vessels are connected by a liquid pipe, E, and a vapor pipe, F, said pipes acting in such connection to maintain a constant level within the vaporizer, in the manner and for the purpose substantially as set forth.

I also claim, combining with such device for vaporizing, a conical disseminator, I, and a convex deflector, K, arranged substantially as specified and for the purpose set forth.

26,049.—George W. Parrott and Charles K. Bradford, of Lynn, Mass., for an Improved Machine for Cutting Boot and Shoe Soles:

We claim the combination and arrangement of an automatic feed, sole by sole, with the cutting-knives, substantially as described.

26,050.—Hiram G. C. Paulson, of Flatland, N. Y., for an Improvement in Clarifying and Refining Sugar Juices, &c.:

I claim the application of alcohol, in combination with water, in all the proportions as stated, and at the temperature of boiling of said combined liquids to the melting or dissolving, boiling or treating raw sugars or juices of saccharine substances, as described, for the purpose and to the effect of producing the intended making and refining of said sugars.

26,051.—Wm. Pellet, of New York City, for an Improved Cooking-range:

I claim the combination with a central fire-grate having openings in its side, and with the side roasting-chambers or spits, of dampers which can be adjusted so that the roasting may either be effected in the side chambers, by direct action of the burning coals, or by the heat radiated from the sides of the fire-chambers, substantially as and for the purposes set forth.

[This invention is an improvement on a range patented by the same inventor, August 10, 1858, which is rendered thereby one of the most efficient and economical ranges now in the market. The roasting-chambers on the sides of the fire-place will be found a very valuable addition by every housekeeper, and the arrangement of the dampers commends itself by its neatness and simplicity.]

26,052.—Edward R. Pye, of New York City, for an Improved Sweat-knife for Cutting Hat and Cap Linings:

I claim the employment or use of the knife on the projection, C, of the bar, B, and secured thereto by the set screw, c, in connection with the pointed wheel, E, attached to the projection, C; the whole being arranged substantially as and for the purpose set forth.

[This invention relates to a tool or implement for simultaneously cutting out, and perforating for sewing, the trimming of hats and caps, technically termed "sweats." The object of the invention is to economize in the construction of the tool, render them far more durable than usual, and so arrange the parts relatively to each other as to insure a perfect adjustment of the same at all stages of their wear.]

26,053.—John Robinson, of Eli, of Sharptown, Md., for an Improvement in Portable Turn-table:

I claim the adjustable sliding turn-table, E E G, the whole constructed and operating substantially as specified for the purpose set forth.

26,054.—Josiah M. Read, of Boston, Mass., for an Improvement in Stoves, Ranges, &c.:

I claim the application and construction of the flue, G, with its door, h, substantially in manner as and for the purposes described.

26,055.—Peter Reynard, of New York City, and Victor Varin, of Brooklyn, N. Y., for an Improved Insect Powder-blower:

We claim, first, The ball, c, attached directly to the chamber or neck, b, and acting to blow the powder out of the neck or chamber, as set forth, and either with or without the valves, 1 and 2, for the purposes and as specified.

Second, We claim the holder, composed of the rod, e, and ring, f, when provided with the rod, g, or its equivalent, and the button, h, to act on the elastic ball, c, for the purposes as described and shown.

26,056.—C. Bird Pate, of Moore's Mill, Ind., for an Improvement in Stump-extractors:

I claim the arrangement of levers, E F and L, and spar, H; the whole being for operation conjointly as and for the purpose set forth.

26,057.—Israel M. Rose, of New York City, for an Improvement in Sewing-machines:

I claim the combination of two needles and a shuttle, or their equivalents, to operate substantially as set forth, for the purpose of producing a stitch of the structure described and represented.

[This invention consists in a novel mode of combining and operating two needles and a shuttle, or their equivalents, to make a stitch of a novel character with three threads.]

26,058.—Christian Charles Schieferdecker, of Baltimore, Md., for an Improvement in Stoves:

I claim the combination of the central air-space, f, containing material refractory to heat, with the series of surrounding ascending and descending smoke-flues, n o p, when arranged substantially as set forth, for the purposes described.

26,059.—Charles Scofield, of Adams, N. Y., for an Improvement in Sewing-machines:

I claim, first, The auxiliary feeding-plate, Q, with pins or teeth on its surface, in combination with the perforated slotted main feeding-plate, N, when said plate, Q, combines in itself the properties of a spring and of a feed-bar, and is otherwise constructed and arranged so as to operate in the manner described.

Second, The arrangement of the pivoted-lever, S, adjustable collar, q, pressure-pad, F F′, and needle-lever, D, in the relation shown to one another and for united operation in the manner and for the purpose set forth.

Third, The lever, S, when made elastic, laterally pivoted at n, provided with a pin, p, and coupled to the pressure-pad, F F′, by an adjustable collar, q, in combination with the needle-lever, D, and the recess, S, in the standard, C, substantially as and for the purpose set forth.

Fourth, The looper, W x U T, when the part U T is made rigid and attached to the horizontal rock-shaft, V, and the part W x is made yielding or with a spring, and formed or arranged on one side of part U T, and in the relation shown to a projection on the peripherical surface, x, of the actuating cam, in the manner and for the purpose described.

Fifth, The combination of the adjustable intermediate plate, 13, with the jaws, T x, of the looper, substantially as described, for the purpose of adapting the same looper, without removing it from the machine which is used, for sewing either in the double-looped or other stitch made with two threads, for sewing in the chain-stitch, as set forth.

[This invention consists in an improvement in the feeding-device of sewing-machines, whereby a more positive movement of the material being sewed, and a greater degree of uniformity in the length of the stitches, are insured; and, in sewing thin fabrics, the liability to pucker is much reduced. It also consists in a certain mode of applying the pressure-pad, in combination with the needle-lever or needle-carrier, whereby the said pad may be caused to rise at the will of the operator, while the needle is in the material being operated upon, to permit the cloth to be turned freely for the sewing of curved seams or stitching of ornamental figures, or may be allowed to remain stationary upon the material in sewing straight or very slightly curved seams. It also consists in a certain construction of looper, applicable either to the loopers of machines for sewing on what is known as the "double-looped stitch," which constitutes the subject of Letters Patent No. 9,592, or to those for sewing the "chain-stitch," by which the missing of the loops by the needle, so common in most machines, is more effectually prevented. It further consists in a certain contrivance applied to a looper, for the purpose of adapting the same looper, without the addition or removal of one of its parts, to the sewing of the chain-stitch or the double-loop stitch, as may be desired.]

26,060.—James Stimpson, of Baldwinsville, Mass., for an Improved Machine for Making Box Joints:

I claim, first, The combination of the hollow bit, r, the cutters, w and d2, or their equivalents, operating as set forth, to form the tenons, a.

Second, In combination with the above, I claim the augur-bit, 12, operating as described, to form the holes, c, to correspond with the tenons, a, as set forth.

26,061.—Chester W. Sykes, of New York City, for an Improved Carving-knife:

I claim the combination of a knife and shears, substantially as described, as an instrument especially adapted for carving meats.

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26,062.—Harvey Trumbull, of Central College, Ohio, for an Improvement in Straw-cutters:

I claim the combination of a self-adjusting spring-pressure clasp, L, to or with an automatic rake, for the purpose of feeding the material to the knife, substantially as specified.

26,063.—Nathaniel Waterbury, of Fond du Lac, Wis., for an Improvement in Gates:

I claim the arrangement and combination of the pendulous-rod, J, and weight, K, with the axis of the pulley, H, as and for the purpose shown and described.

26,064.—James Whitehill, of Frederick, Md., for an Improvement in Hot-air Furnaces:

I claim, first, A furnace constructed with two separate fire-chambers and grates, with an air passage between the chambers closed at their sides, but open at the bottom and top, substantially as and for the purposes set forth.

Second, The combination of the peculiar labyrinthian air-passage described, and the peculiar furnace described, in the manner and for the purpose set forth.

Third, The combination, with the peculiar furnace and peculiar labyrinthian air-passage described, of the curved cold-air pipe, M, substantially in the manner and for the purpose set forth.

[This furnace has two separate chambers, and thus secures the advantage of having a fire in one chamber, with a deep bed of coal in moderately cold weather, and fire in both chambers in very cold weather. The cold-air is drawn from the floor of the building into the furnace, and heated before it re-enters the same. The draft is supplied at all sides of the furnace; and thus the burning of the fuel in a perfect manner, whatever be the direction of the wind-current, is effected. This appears to be a very good arrangement.]

26,065.—Ferdinand Wuterich and Jacob Kœrber, of New York City, for an Improvement in Cotton-gins:

We claim the arrangement of the finger-shafts, C and D, operating and constructed in the manner described, and acting together so that, while the fingers of the shaft, C, during its revolution, pull the cotton out of the hopper, the fingers of the shaft, D, take the cotton from the former, and deposit the same upon the guiding-rollers, substantially as specified.

26,066.—William C. Allison, of Philadelphia, Pa. (assignor to himself and John Murphy, of same place), for an Improvement in the Mode of Confining the Seat of the Driver on City Railroad Cars:

I claim the combination of the board, D, rod, E, with its collar, f, and the catch, h, when the said rod serves the double purpose of supporting the seat, and, in conjunction with the catch, h, of maintaining the seat folded up out of the way, and when the several parts are arranged in the front of the car as and for the purpose set forth.

26,067.—Henry C. Brown, of Buffalo, N. Y. (assignor to Charles O. Brown, of Dalton, Mass.), for an Improved Handle for Smoothing-irons:

I claim a ventilated smoothing-iron handle, constructed for the purposes substantially as described.

26,068.—William E. Cooper, of Dunkirk, N. Y., assignor to Charles D. Gibson, of New York City, for an Improvement in Railroad Car Springs:

I claim the combination and arrangement of groups of four springs by and with the suspension bracket or stirrup, B B, &c., constructed, arranged and operating in the manner above described.

26,069.—John Danner, (assignor to himself and J. M. Jay) of Canton, Ohio, for an Improvement in Sleeping-cars:

I claim the combination of the hinged back d', with the hinged and reversible frame, D', and removable piece, E, constructed and arranged to operate in relation to seat, c', and false back, d, of the back, B', substantially as and for the purposes set forth.

26,070.—Pearson B. Kitchen (assignor to William H. Marshall) of Philadelphia, Pa., for an Improvement in Apparatus for Heating Hydro-carbon Liquids:

I claim the application to gas generators of a hot-air chamber as previously described, and the submerging of one or more air pipes therefrom, into and upon the chemicals, for the purposes set forth and described, or any other substantially the same and which will produce the intended effect.

26,071.—A. H. Knapp (assignor to himself, E. H. Barstow, and A. R. Trowbridge), of Newton Center, Mass., for an Improvement in Lamps:

I claim the wick portion, I, arranged and operating substantially as and for the purpose described.

26,072.—Ambrose Lovis, assignor to himself and Chas. E. Hodges) of Boston, Mass., for an Improvement in Composition for Detergent Purposes:

I claim the above-described cleansing, bleaching, and disinfecting liquid, consisting of an alkaline silicate combined with chlorine, for the purpose specified.

26,073.—James A. Whipple, of Boston, Mass., assignor to himself and George A. Stone, of Roxbury, Mass., for an Improvement in Method of Driving Piles:

I claim the method or process of driving piles by exploding charges of gunpowder or its equivalent between the pile and a fulcrum or resistance, so that the force of the explosion shall wholly or partially act to drive the pile in the direction of its length, or nearly so.

26,074.—Joseph Barrans, of Caledonia Terrace, Queen's Road, Peckham, County of Surrey, England, for an Improvement in Portable Locomotives:

I claim, first, The method herein described of supporting the front portions of traction or portable steam-engines, by means of a spring or elastic beam or lever, at or near the middle thereof; the said beam or lever being arranged constantly to occupy a position in a vertical plane passing through the axis of the boiler, by having its near and front ends applied and jointed respectively to the bottom of the barrel of the boiler and to the fore-carriage, substantially as and for the purpose set forth.

Second, The application and use, in traction engines, of tensional rods or bars for retaining the driving-wheel centers at the proper distance asunder from the axis of the ground driving-wheels.

Third, The application and use, in traction and portable steam-engines, of ground driving-wheels, in two or more sections capable of being put in and out of working action for the purpose described, and such wheels having teeth holding projections upon their peripheries of the form and arrangement described.

RE-ISSUES.

De Witt C. Cummings, of Fulton, N. Y., for an Improvement in Straw-cutters. Patented Aug. 7, 1855:

I claim first, Operating the adjustable lower feed-roller by means of a spur-wheel hung in a vibrating frame or yoke, the axis of which is connected with the said roller by means of an universal coupling, when said roller is supported on spring bearings independent of each other, substantially as and for the purpose specified.

Second, The employment of a cylinder provided with a knife or knives which have an upward cylindrical cut, when the same is arranged with two independent feed-rollers, the lower one of which being supported on a spring or springs in such a manner that it can be adjusted to act with greater or less pressure on the material to be cut, substantially as set forth.

William M. Henderson, of Baltimore, Md., for an Improvement in Pumps. Patented Oct. 4, 1859:

The two ball valve cages with the suction valves in their interior, attached to the extremities of a central perforated tube or its equivalent, in combination with the water-ways and discharge valve or valves; the water entering between the plunger valves and alternately discharged from the ends of the pump barrel in direction of the stroke; the whole being operated and constructed substantially in the manner and for the purposes set forth.

John H. Lyon, of New York City, for an Improved Lock and Detector. Patented Sept. 13, 1859:

I claim combining with a padlock or any lock provided with a shackle, a lead or soft metal tube or seal, so arranged as to be temporarily secured thereto and admitting of being released only by the removal or breaking of said tube or seal, which thereby serves as a detector, substantially as set forth.

[An engraving of this lock will appear soon in this journal.]

ADDITIONAL IMPROVEMENT.

Mortimer Nelson, of New York City, for an Improved Gold-washer. Patented Oct. 4, 1859:

I claim, first, Imparting to the shaft, p, and the series of pans thereon, an intermittent or oscillating movement for the purposes and as specified; and in combination with the shaft, p, and pens having the intermittent or oscillating movement set forth, I claim the cam, h, and ball, i, to give the vertical or jigging movement as specified.

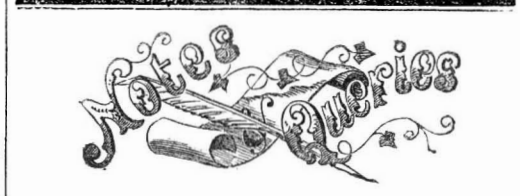
Second, The conical hoods or funnels, o o', in combination with the pans, n n, for the purposes and as specified.

EXTENSION.

Thaddeus Hyatt, of New York City, for an Improvement in Vault Covers. Patented Nov. 12, 1845. Re-issued April 3, 1855:

I claim making them of a metallic grating or perforated metallic plate, with the apertures so small that persons or bodies passing over or falling on them may be entirely sustained by the metal, substantially as described, but this I only claim when the apertures are protected by glass, substantially as and for the purpose specified.

And I also claim, in combination with the grating or perforated cover and glass fitted thereto, the knobs or protuberances on the upper surface of the grating or perforated plate, for preventing the abrasion or scratching of the glass, substantially as specified.



F. B. C., of La.—Your fear that, if you should employ us to get up an engraving and publish a description of your invention in the SCIENTIFIC AMERICAN, the printing of so large an edition from it would wear out the engraving, is unfounded. The engravings which are prepared for this paper are not printed from, at all; the impression being taken from electrotype plates, so that the engravings are furnished to the parties ordering them, just as perfect as they came from the hands of the engraver. If we printed from the type and wood-cuts as we formerly did, when our circulation was much smaller, and as every other paper of like character now does, your apprehension would be well founded; but as it is, your engraving will not be injured by us in the least, and you can judge of the benefit you will derive from having your invention brought before the public through the medium of a paper of the standing and circulation of the SCIENTIFIC AMERICAN. It is only such good inventions as yours that we solicit the privilege of illustrating in our columns, while those of indifferent merit we cannot publish. The engravings in the SCIENTIFIC AMERICAN are executed expressly for it; none are ever inserted by us after their appearance in any other American publication. So the reader, when he receives his paper weekly, may depend upon seeing illustrations of something which he has never seen before. We have a two-fold object in answering your inquiries through our correspondence column: the first is to give you the information you solicit, and the second is to answer the thousand-and-one applications we receive, requesting us to insert second-hand engravings of second or third-rate inventions in our columns. We publish a paper for intelligent readers, and we will not impose upon them or mar our pages with poor illustrations.

SPOKE MACHINES.—N. Chapman, of Lansing, Mich., wishes to correspond with some manufacturers of lathes for turning spokes.

W. G., of Ohio.—We cannot encourage you to spend money on an application for a patent on your invention.

D. D. P., of N. C.—We think it advisable not to publish your theory. It may be correct, but it might lead to a controversy suited only to a medical journal.

F. B. G., of N. Y.—We do not wish to dispose of those little engravings you refer to, but will supply you with electrotypes for 50 cents each. Your idea of a motive power is absurd. You cannot make a water-wheel pump up water to drive itself any more than you can lift yourself over a fence by pulling-up the seat of your pantaloons.

D. R., of N. Y.—Sulphite of lime is prepared by saturating carbonate or milk of lime by sulphurous acid. Sulphurous acid is produced by burning roll brimstone in the air, and milk of lime by dissolving quick lime in water. Wm. H. Hovey, who patented a corn-sheller in April, 1859, resides in Springfield, Mass. The other matter in your letter we shall thoroughly investigate as soon as we can find time.

S. S. M., of S. C.—You will find our promised article on heat, in reply to your question, in another column.

H. L. C., of Ill.—To produce the electric light, take two small pieces of the hard carbon which collects in gas retorts, sharpen them to a point, attach one to the wire leading from the copper plate of a galvanic battery and the other to the wire leading from the zinc plate, bring the two points together, and then draw them slightly apart.

H. B. W., of Conn.—Lenses are ground by machinery.

J. M. J., of La.—The statement which you cite from Ure's "Dictionary of Arts," page 658, is very curious certainly. "A smooth-bottomed pan will evaporate over flame as fast as a corrugated one, having three times the surface; while, if both pans are immersed in a fluid, the evaporation is just in proportion to the surface of the bottom." You think "the difference is due to the density of the fluid medium pressed directly in contact with the surfaces." This is a fair specimen of the "explanations" of which the old books on science used to be full, but which are less common in this day. Students of nature are very generally learning the great truth that we live surrounded by mysteries which cannot be explained. For our own part, we can understand Ure's statement, but cannot understand your explanation.

R. T. C., of N. Y.—You cannot obtain a patent for the new use or application of a well-known mechanical device. Various alloys are used for bell metal; 80 per cent of copper and 20 of tin is said to be as good as any. A steel bar, bent in the form of a triangle, gives a very clear, sharp sound when struck.

J. A. M., of Pa.—Almost every manufacturer of friction matches has his own peculiar receipt for preparing his composition. We give you one. Take 6 lbs. of fine glue and soften it with water to a smooth jelly, heat it to a temperature of 150° and rub 4 lbs. of phosphorus into it, then add 10 lbs. of saltpeter, then 5 lbs. of red lead, and lastly, 2 lbs. of smalt; mix the whole into a uniform paste. Persons employed in dipping matches in close rooms are subject to a terrible disease of the jaws, which results in the loss of the teeth, and in many cases of the jaw-bone itself. It is caused by the fumes of phosphorus.

ENQUIRER, of Quebec, Canada.—Your letter is interesting, but anonymous. If you had given us your name we should have published it.

Money Received

At the Scientific American Office on account of Patent Office business, for the week ending Saturday, Nov. 12, 1859:—

J. G., of Conn., $30; R. L. R., of Pa., $30; R. M., of Pa., $30; G. M., of Conn., $30; T. S. U., of N. Y., $25; T. H. W. & Bro., of Ga., $30; G. K., of N. Y., $30; D. M. H., of Conn., $25; N. L., of Conn., $32; A. P. M., Jr., of Miss., $55; A. G., of N. Y., $15; H. E. W., of Mass., $25; J. S., of R. I., $30; C. R. K., of Pa., $30; W. W. W., of Mass., $40; J. S. C., of Pa., $25; W. A. S., of N. Y., $20; C. H., of N. Y., $25; J. I. R., of Ill., $25; H. B. J., of N. J., $70; W. D. B., of Ohio. $20; J. F. H., of N. Y., $30; A. P. T., of Ga., $20; C. & McC., of Iowa, $30; T. Van D., of N. J., $25; I. Y. C., of Mass., $25; L. O. C., of N. Y., $10; C. & Z. W., of N. J., $30; E. A. G., of Conn., $30; F. & I., of Pa., $25; M. & B., of R. I., $30; A. W., of N. Y., $30; J. H. S., of C. W., $25; N. J. E., of Wis., $25; J. C. S., of Mass., $55; D. C., of N. Y., $30; J. A. A., of Ill., $25; N. S., of Minn., $30; G. W. S., of Conn., $30; E. D., of Wis., $30; H. F., of La., $25; M. R., of N. Y., $250; N. C. K., of Mass., $20; S. T. P., of Ga., $25; H. B. F., of N. Y., $55; F. D. B., of Mass., $30; J. D., of Ill., $25; P. H., of Pa., $57; O. M. P., of Ill., $30; T. S. W., of N. Y., $25; J. B., of N. Y., $55.

Specifications, drawings and models belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday, Nov. 12, 1859:—

D. M. H., of Conn.; T. Van D., of N. J.; H. F., of La.; W. W. W., of Mass. (2 cases); J. D., of Ill.; S. T. P., of Ga.; J. S. C., of Pa.; J. B., of N. Y.; J. Y. C., of Mass.; W. B. D., of Conn.; J. & D., of Ala.; G. W. R. B., of La. (3 cases); C. R. K., of Pa.; H. E. W., of Mass.; N. J. E., of Wis.; J. C. S., of Mass.; T. S. U., of N. Y.; A. P. T., of Ga.; N. C. K., of Mass.; H. A. R., of Ohio; C. H., of N. Y.; J. H. S., of C. W.

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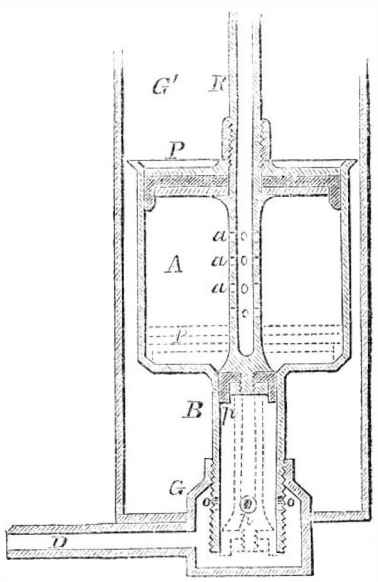
The great amount of trouble caused by the freezing of the hydrants from which water is drawn from the pipes in cities, has stimulated inventors to devise plans for obviating the difficulty. Of all these which we have examined we like best the one represented in the accompanying engravings.

Our second illustration is a sectional view of all the working parts of the hydrant. A is the inside of the large or upper part of the metal cylinder, and B is the outside of the small part of the same cylinder. R is the discharge pipe into which the water flows through holes, *a a a a*, placed between the pistons. The pistons are permanently attached to the discharge pipe, and move with it; the large one above the holes just mentioned and the small one below. The large piston



fills the upper part of the cylinder, and the small one the lower part. Near the lower end of the small part of the cylinder are other holes, *o o*, in the cylinder itself, which holes are within the iron water-chamber, G.

By raising the handle the pipe is forced down, carrying the pistons. As soon as the small piston is below the holes, *o o*, near the bottom of the cylinder, the water flows through these holes into the cylinder, and then, entering the pipe, R, through the holes, *a a a a*, escapes at the nozzle or upper end of the discharge pipe. While drawing water, it will be noticed that both of the pistons are at the bottoms of their cylinders. When the handle is released, the pistons and pipe are forced upward by the pressure of the water at the bottom of the lower cylinder. Having risen so that the lower piston is above the holes, *o o*, the flow of water to the pipe ceases. The remainder of the upward motion, which is about two inches, leaves a space in the large cylinder, under the large piston, into which the water in the pipe descends. The pipe is thus instantly emptied; its water placed within the cylinder and completely below the influence of frost, where it remains until the next drawing.

These hydrants also operate as safety valves to prevent the collapse of boilers in case the opening of these is neglected whenever the water is drawn from the mains. The moment a district is shut off and the water drawn from the pipes in that district, the pressnre from the water works upon the lower piston ceases; the discharge pipe and its pistons sink immediately in the cylinders, and the moment the lower portion passes below the holes in the lower cylinder, a free current of air passes through the discharge pipe directly to the boiler, effectually preventing any collapse.

These hydrants are manufactured by the Meter and Hydrant Company of Brooklyn, at Nos. 53, 55 and 57 First-street, Williamsburg, N. Y. The perspective view represents the most expensively ornamented style for streets, parks, &c., though a variety of cheaper and plainer ones are also made. They are being generally introduced into this city. The patent for the invention was issued to G. P. Perrine and J. E. Boyle, of Richmond, Va., June 23, 1857.

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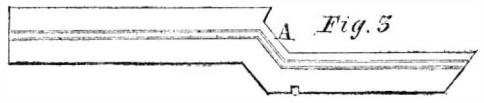
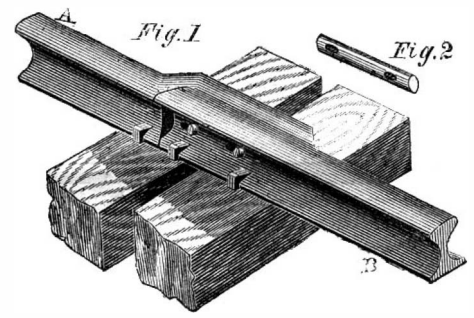


Fig. 3



demanding in this country millions of dollars yearly for the repair of rails, of which all but the ends are in good condition. Great efforts have been made to remedy this evil. The Great Western Railway of Canada has the rails double, equivalent to splitting them vertically, and laid so as to break joints; and all passengers notice the smoothness with which the cars roll over that road.

We illustrate here a cheaper plan for accomplishing the same result. It consists simply in bending about a foot of the end of one rail outside of the adjoining rail, the latter having its end cut off at an angle of about 45 degrees. In Fig. 1 A is the bent rail. Fig. 2 represents the core of wood used to fill the hollow space formed by two T-rails lying alongside of each other; and Fig. 3, the manner in which the flange of the bent rail must be cut to permit the tops of the rails to come together. In bolting rails together provision must be made for the slip of the ends longitudinally from the expansions and contractions of the rails.

The patent for this simple device was granted to G. S. Avery, of Cross River, N. Y., Sept 13, 1859; he will be pleased to answer all inquiries in relation to it which may be addressed to him at that place. Patents on this invention has been secured in foreign countries.

CHANGE OF SEA CURRENTS.—The currents in Beaufort harbor, N. C., have become much stronger than they were some years ago, and yet the tides rise no higher. A correspondent (E. L. Perkins) writing on this subject from Carolina City, states that in various channels where the fishermen, 15 years ago, caught fish with set nets, they cannot do so now, owing to the rapidity of the currents. The people on that coast are perplexed at this behavior of the sea, and cannot account for the phenomena.

GRAPHITE PAINT.

MESSRS. EDITORS:—The communication on page 165, this volume of the SCIENTIFIC AMERICAN, on the subject of graphite paint, over the signature of Quarterman & Son, deserves correction. The analysis is wrong; "20 of linseed oil, and 80 graphite" will not make paint. The paint to which they refer has only pure raw linseed oil or graphite in it, but long experience taught the necessity of properly preparing the graphite for grinding; it is this knowledge which enables the company to make the best paint of this kind in the world. The comunication referred to, while admitting the excellence of graphite paint for wood and iron, alleges that it is "not good for copper and new tin," but it very carefully omits to venture any reason for this assertion, which is in the face of the facts. Graphite is, according to all chemical authority, the most indestructable of all materials, insensible to acids and alkalies, to heat and cold, neither contracting nor expanding; being the purest of carbon; rivaling the diamond; it is anti-septic, will prevent and stay rust in iron and decay in wood. It is alike good for new tin as for other substances. Graphite, in the language of Professor Emmons, possesses "a nature unequaled for strength by any substance," it is of great body, and works with marvelous facility. New tin roofs painted 12 years ago, are now apparently as good as when first painted. For bridges and railroad timber, it is the cheapest and most efficient prevention of decay. Graphite will keep the bottoms of vessels clean from grass or barnacles. If the paint be rubbed with fine sand-paper and a hard brush, it will become as smooth as enamel, and can always be kept bright by rubbing.

Painters are in the habit of buying the dry graphite and mixing it with oil; this mixture will not compare with the ground graphite paint when properly prepared. Graphite paint effectually excludes damp; being anti-attritious it turns water like the back of a duck.

W. H. W.

WARM WEATHER IN ENGLAND.—The London papers note the great heat of the weather and the unusual prevalence of the aurora borealis. On Oct. 4th the thermometer rose to 77½° in the shade and 93° in the sun. On the 5th it stood at 73° in the shade. The heat on the 4th was greater than in any October for the last 60 years. The nearest approach to it was in 1802, when it reached 75°. The aurora does not seem to have elevated the temperature of our atmosphere. We have had very early and severe frosts.

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